

vol 18 no 3 MARCH 61

American Journal of Hospital Pharmacy

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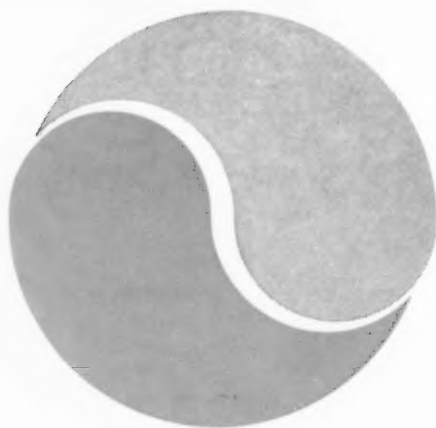
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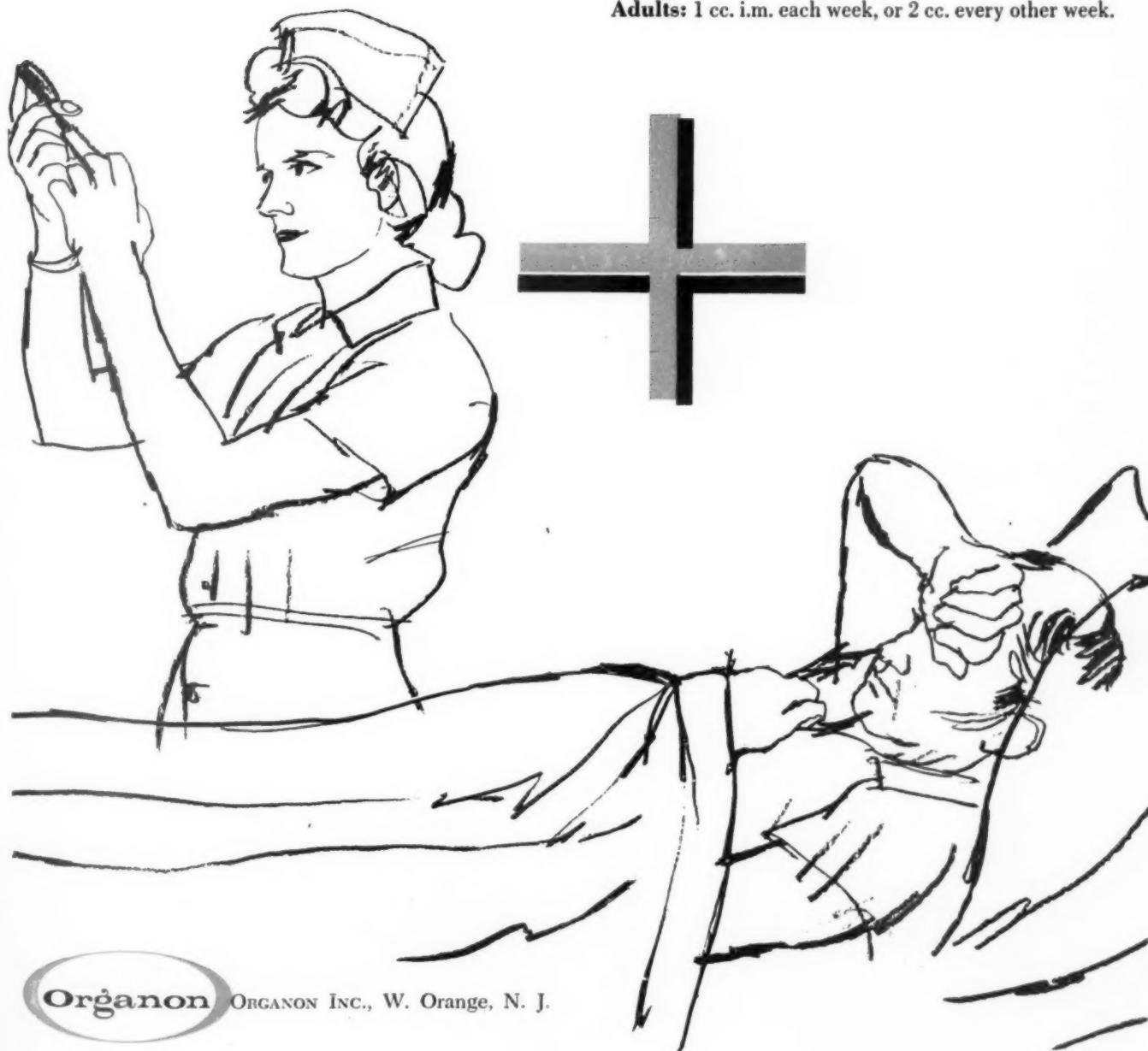
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1. Baer, S., et al.: J.A.M.A. 167:704, June 7, 1958. 2. Moser, K. M.:
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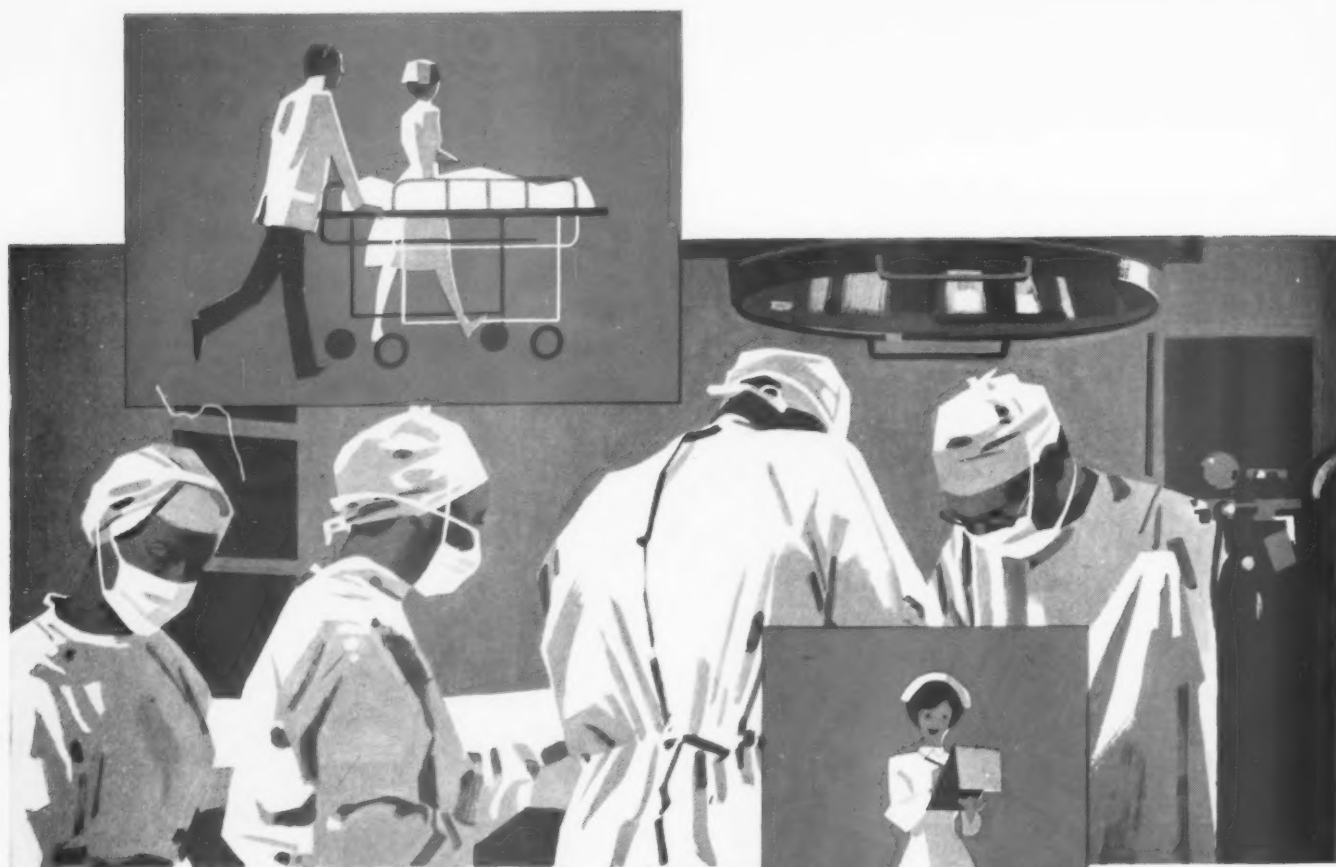
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References: 1. Carpenter, E. B.: Southern M.J. 51:627, 1958. 2. Forsyth, H. F.: J.A.M.A. 167:163, 1958. 3. Grisolia, A., and Thomson, J. E. M.: Clin. Orthopaedics 13:299, 1959. 4. Leventen, E. O., and Vaccarino, F. P.: Current Therap. Res. 2:497, 1960. 5. Lewis, W. B.: California Med. 90:26, 1959. 6. O'Doherty, D. S., and Shields, C. D.: J.A.M.A. 167:160, 1958. 7. Park, H. W.: J.A.M.A. 167:166, 1958. 8. Plumb, C. S.: Journal-Lancet 78:531, 1958. 9. Poppen, J. L., and Flanagan, M. E.: J.A.M.A. 171:298, 1959. 10. Schaubel, H. J.: Orthopaedics 1:274, 1959.

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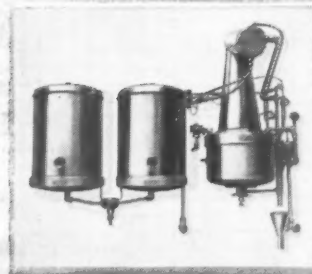
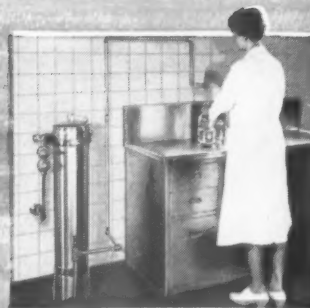
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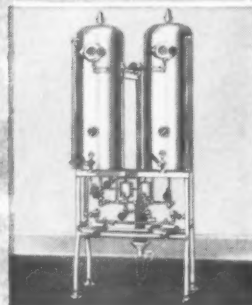
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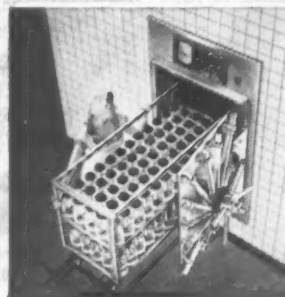
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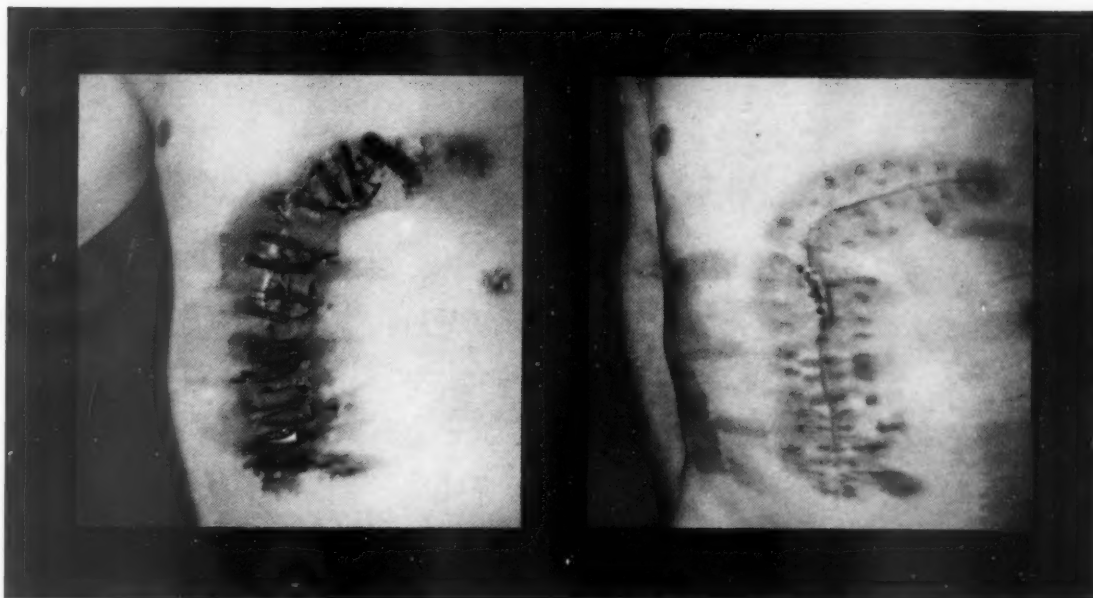
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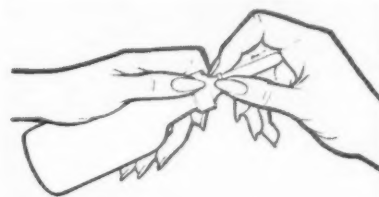
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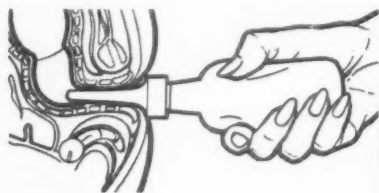
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NEW SYNTHETIC PENICILLIN FOR "RESISTANT" STAPH

MICROBIOLOGICAL AND PHARMACOLOGICAL PROPERTIES

In vitro studies show that STAPHICILLIN is a bactericidal penicillin with activity against staphylococci resistant to penicillin G. Strains of staphylococci so far tested have been sensitive to STAPHICILLIN *in vitro* at concentrations of 1-6 mcg. per ml. These levels are readily attained in the blood and tissues by administration of STAPHICILLIN at the recommended dosage. This unique attribute is probably due to the fact that STAPHICILLIN is stable in the presence of staphylococcal penicillinase. STAPHICILLIN also resists degradation by *B. cereus* penicillinase. The antimicrobial spectrum of STAPHICILLIN with regard to other microorganisms is qualitatively similar to that of penicillin G; but considerably higher concentrations of STAPHICILLIN are required for bactericidal activity than is the case with penicillin G.

STAPHICILLIN is rapidly absorbed after intramuscular injection. Peak blood levels (6-10 mcg./ml. on the average after a 1.0 Gm. dose) are attained within 1 hour; and then progressively decline to less than 1 mcg. over a 4 to 6 hour period. It is poorly absorbed from the gastrointestinal tract. STAPHICILLIN is rapidly excreted by the kidney.

As shown by animal studies, STAPHICILLIN is readily distributed in body tissues after intramuscular injection. Of the tissues studied, highest concentrations are reached in the kidney, liver, heart and lung in that order; the spleen and muscles show lower concentrations of the antibiotic. STAPHICILLIN diffuses into human pleural and prostatic fluids, but its diffusion into the spinal fluid has not yet been completely studied. However, one patient with meningitis showed a significant concentration in his spinal fluid while on STAPHICILLIN therapy.

Toxicity studies with STAPHICILLIN and penicillin G in animals show that they have approximately the same low order of toxicity.

Certain staphylococci can be made resistant to STAPHICILLIN in the laboratory, but this resistance is not related to their penicillinase production. During the clinical trials, no STAPHICILLIN-resistant strains of staphylococci were observed or developed; the possibility of the emergence of such strains in the clinical setting awaits further observation.

PRECAUTIONS

During the clinical trials, several mild skin reactions, e.g., itching, papular eruption and erythema were observed both during and after discontinuance of STAPHICILLIN therapy. Patients with histories of hay fever, asthma, urticaria and previous sensitivity to penicillin are more likely to react adversely to the penicillins. It is important that the possibility of penicillin anaphylaxis be kept in mind. Epinephrine and the usual adjuvants (antihistamines, corticosteroids) should be available for emergency treatment. Because of the resistance of STAPHICILLIN to destruction by penicillinase, parenteral *B. cereus* penicillinase may not be effective for the treatment of allergic reactions. Information with regard to cross-allergenicity between penicillin G, penicillin V, phenethicillin (Syncillin) and STAPHICILLIN is not available at present. If superinfection due to Gram-negative organisms or fungi occurs during STAPHICILLIN therapy, appropriate measures should be taken.

SUPPLY

List 79502 — 1.0 Gm. dry filled vial.

BRISTOL LABORATORIES • SYRACUSE, NEW YORK

Division of Bristol-Myers Company

NEW SYNTHETIC PENICILLIN FOR "RESISTANT" STAPH

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STAPHICILLIN™*(sodium dimethoxyphenyl penicillin)***For Injection****DESCRIPTION**

STAPHICILLIN is a unique new synthetic parenteral penicillin produced by Bristol Laboratories for the specific treatment of staphylococcal infections due to resistant organisms. Its uniqueness resides in its property of resisting inactivation by staphylococcal penicillinase. It is active against strains of staphylococci which are resistant to other penicillins.

Each dry filled vial contains: 1 Gm. STAPHICILLIN (sodium dimethoxyphenyl penicillin), equivalent to 900 mg. dimethoxyphenyl penicillin activity.

INDICATIONS

STAPHICILLIN is recommended as specific therapy only in infections due to strains of staphylococci resistant to other penicillins, e.g.:

Skin and soft tissue infections: cellulitis, wound infections, carbuncles, pyoderma, furunculosis, lymphangitis and lymphadenitis.

Respiratory infections: staphylococcal lobar or bronchopneumonia, and lung abscesses combined with indicated surgical treatment.

Other infections: staphylococcal septicemia, bacteremia, acute or subacute endocarditis, acute osteomyelitis and enterocolitis.

Infections due to penicillin-sensitive staphylococci, streptococci, pneumococci and gonococci should be treated with Syncillin® or parenteral penicillin G rather than STAPHICILLIN. Treponemal infections should be treated with parenteral penicillin G.

DOSAGE AND ADMINISTRATION

STAPHICILLIN is well tolerated when given by deep intragluteal or intravenous injection.

As is the case with other antibiotics, the duration of therapy should be determined by the clinical and bacteriological response of the patient. Therapy should be continued for at least 48 hours after the patient has become afebrile, asymptomatic and cultures are negative. The usual duration has been 5-7 days.

Intramuscular route: The usual adult dose is 1 Gm. every 4 or 6 hours. Infants' and children's dosage is 25 mg. per Kg. (approximately 12 mg. per pound) every 6 hours.

Intravenous route: 1 Gm. every 6 hours using 50 ml. of sterile saline solution at the rate of 10 ml. per minute.

**Warning:* Solutions of STAPHICILLIN and kanamycin should not be mixed, as they rapidly inactivate each other. Data on the results of mixing STAPHICILLIN with other antibiotics are being accumulated.

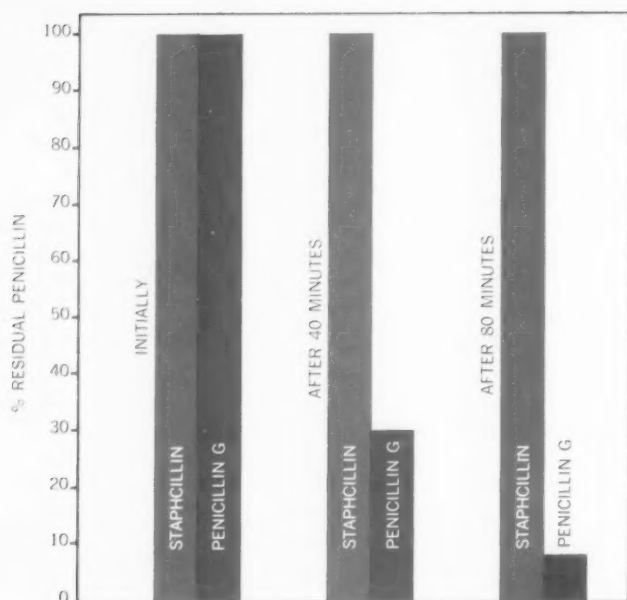
DIRECTIONS FOR RECONSTITUTION

Add 1.5 ml. sterile distilled water or normal saline to a 1 Gm. vial and shake vigorously. Withdraw the clear, reconstituted solution (2.0 ml.) into a syringe and inject. The reconstituted solution contains 500 mg. of STAPHICILLIN per ml. Reconstituted solutions are stable for 24 hours under refrigeration.

For intravenous use, dilute the reconstituted dose in 50 ml. of sterile saline and inject at the rate of 10 ml. per minute.

*This statement supersedes that in the Official Package Circulars dated September and/or October, 1960.

(continued)



In the presence of staphylococcal penicillinase, STAPHCILLIN remained active and retained its antibacterial action. By contrast, penicillin G was rapidly destroyed in the same period of time. (After Gourevitch et al., to be published)

Specifically for "resistant" staph...

StaphcillinTM

sodium dimethoxyphenyl penicillin
FOR INJECTION

The failure of staphylococcal infections to respond to penicillin therapy is attributed to the penicillin-destroying enzyme, penicillinase, produced by the invading staphylococcus.

Unlike other penicillins:

1 STAPHCILLIN is effective because it retains its antibacterial activity despite the presence of staphylococcal penicillinase.

2 The clinical effectiveness of STAPHCILLIN has been confirmed by dramatic results in a wide variety of infections due to "resistant" staphylococci, many of which were serious and life-threatening.

Like other penicillins:

STAPHCILLIN has no significant systemic toxicity. It is well tolerated locally, and pain or irritation at the injection site is comparable to that following the injection of penicillin G. *In occasional cases, typical penicillin reactions may be experienced.*

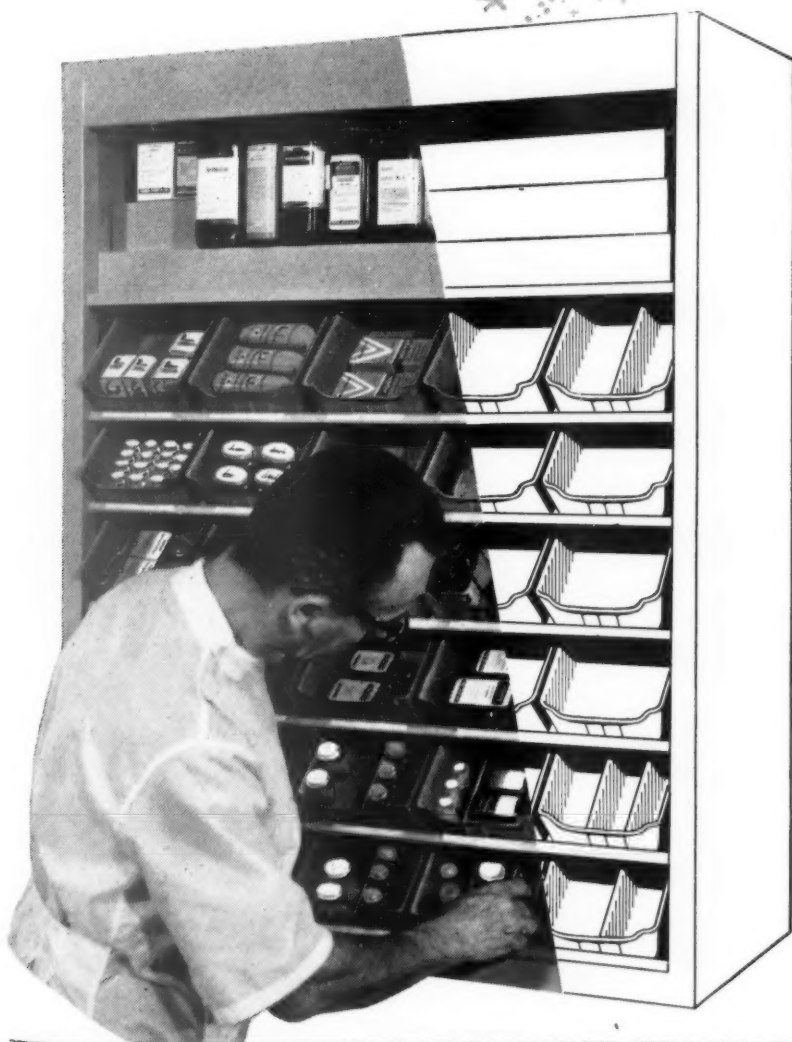
PROFESSIONAL INFORMATION SERVICE — The attached Official Package Circular provides complete information on the indications, dosage, and precautions for the use of STAPHCILLIN. If you desire additional information concerning clinical experiences with STAPHCILLIN, the Medical Department of Bristol Laboratories is at your service. You may direct your inquiries via collect telephone call to New York, PLaza 7-7061, or by mail to Medical Department, Bristol Laboratories, 630 Fifth Ave., N. Y. 20, N. Y.

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DRUGS ARE PUT INTO ORBIT WITH MAGAZINE Space Saver DISPENSER

Placed at dispensing counter — the McKESSON MAGAZINE DISPENSER with fiberglass trays on inclined shelves, stores more than four times the usual number of faster-moving prepackaged pharmaceuticals — gives you finger-tip control of stock — dispenses automatically for a saving in time, steps and space.

Easily movable partitions, a wide variety of trays and a step shelf at top for extra storage, allows full flexibility for packages of various sizes and shapes.

AS ILLUSTRATED: Wall assembly No. 200 of the McKESSON MAGAZINE DISPENSER comes with 30 fiberglass-reinforced plastic trays. The cabinet is 35" long, 16" wide and 47 1/4" high. Each tray has two adjustable partitions; extra trays available.

ALSO AVAILABLE: With the Magazine Space Saver Dispenser is the MAGAZINE CABINET CUPBOARD BASE No. 250, 35" wide, 16" deep and 82 1/4" high. The base has one adjustable shelf.

CONQUER SPACE WITH COMPACT Control CABINET

YOU CONTROL CAPACITY because there are adjustable trays inside the cabinet and on the outside doors to utilize wasted space so often found in ordinary cabinets.

YOU CONTROL FLEXIBILITY since trays are movable and interchangeable to take care of a variety of storage space requirements. Wide swinging doors give a clear view of cabinet contents.

AS ILLUSTRATED: The McKESSON COMPACT Control CABINET is 35" W, 16" D and 30 3/4" H. It comes with 20 adjustable steel trays with transparent plastic leading edges for visibility.



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From the address by Irvine H. Page, M.D., Director of Research, Cleveland Clinic Foundation, at ceremonies of October 6, 1960 held in dedication of the Pfizer Medical Research Laboratories



The 400 scientists and supporting technical and administrative staff in the microbiological, macrobiological, chemical and biochemical research units of the Groton laboratories are part of the world-wide Pfizer research team. This international research project numbers 1,000 men and women who, through organized knowledge, help to create new and better drugs ...all in quest of freedom from disease.

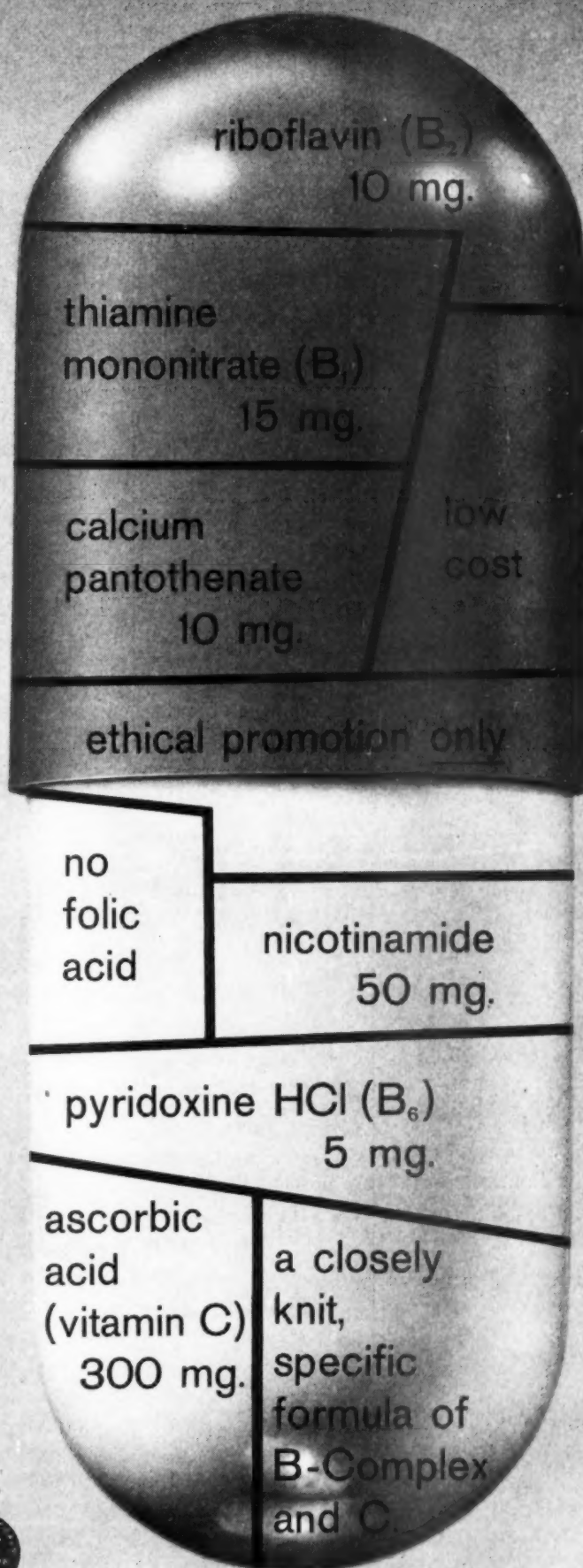
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IN RETINAL DETACHMENT SURGERY—
In 15 of 26 scleral buckling procedures "its use was definitely helpful."

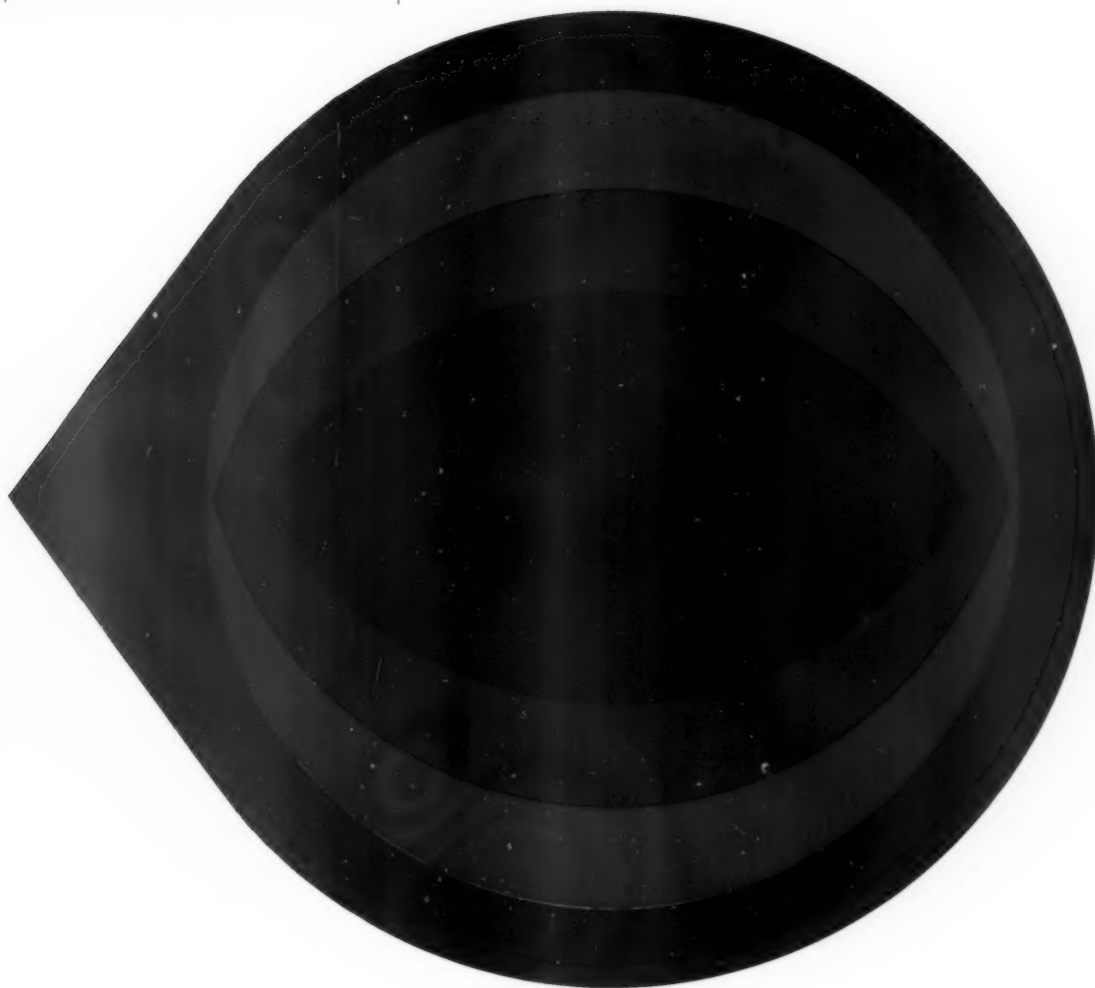
IN ORBITAL SURGERY—
"orbital exploration has definitely been facilitated."

Reference: Javid, M., and Davis, M.: Scientific Exhibit No. 922, A.M.A. Annual Meeting (June) 1960.

Information You Would Request: UREVERT is a special modification of an old agent—urea. The specifications—30% urea, lyophilized and highly purified, in combination with 10% invert sugar (TRAVERT[®])—were found to be optimal by researchers at the University of Wisconsin Medical School. More than four years of basic and clinical study have firmly established the value of UREVERT as the preferred agent for brain decompression, and now to reduce intraocular pressure.

The high urea concentration (30%) was made possible by extreme purification. The 10% invert sugar was found to be the only sugar solution, among many tested, that kept subjects consistently free of hemoglobinuria. The present UREVERT kit provides the purest materials and the optimal concentrations in the safest possible, most convenient form, in order to save time and eliminate contamination.

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THE DRUG THAT REDUCES INTRAOCULAR PRESSURE EVEN IF MIOTICS AND CARBONIC ANHYDRASE INHIBITORS HAVE FAILED

Indications: UREVERT has proven to be extremely effective in reducing intracranial pressure preoperatively and postoperatively, irrespective of cause. Recent evidence shows that UREVERT will reduce intraocular pressure even when miotics and carbonic anhydrase inhibitors fail. It has been used with success in acute angle closure glaucoma, preparation for intraocular surgery, retinal detachment surgery, orbital surgery.

Dosage: Intravenously, one gram urea per kilogram body weight at rate of approximately 60 drops per minute.

Repeated Administration: 1. Careful recording of fluid intake and urinary output. 2. Maintain a positive water balance. 3. Maintain electrolyte balance and observe B.U.N. *Note:* In all cases under general anesthesia an indwelling catheter is necessary.

Contraindications: 1. Severe renal damage. 2. Active intracranial bleeding. 3. Marked dehydration.

Caution: 1. Keep needle securely within lumen of vein to avoid extravasation. If pain at site of injection, relieve by injection of 0.5 cc. of 1% procaine through same needle. 2. Lower extremity infusion in older patients.

Side Effects: Headaches may occur in patients with normal intracranial pressure from marked lowering of intracranial pressure. Keep patient flat in bed for duration of UREVERT administration and subsequent 2-3 hours.

REFERENCES: 1. Fremont-Smith, F., and Forbes, H. S.: *Arch. Neurol. & Psychiat.* 18:550 (Oct.) 1927. 2. Javid, M., and Settlage, P.: *J.A.M.A.* 160:943 (March 17) 1956. 3. Javid, M.; Settlage, P., and Monfore, T.: *Surgical Forum* 7:528, 1957. 4. Javid, M., and Settlage, P.: *Tr. Am. Neurol. A.* 1957, pp. 151-153. 5. Javid, M., and Anderson, J.: *Surgical Forum* 9: 1959. 6. Javid, M.: *Surg. Clin. North Am.* 38:907 (Aug.) 1958. 7. Javid, M., and Anderson, J.: *J. Lab. & Clin. Med.* 53:484 (March) 1959. 8. Stubbs, J., and Pennybacker, J.: *Lancet* 1:1094, 1960. 9. Tench, J. H.; Javid, M., and Gilboe, D.: *Anesthesiology* 27:117 (Jan.-Feb.) 1960. 10. Javid, M., and Davis, M.: Scientific Exhibit No. 922, A.M.A. Annual Meeting (June) 1960.

Can you afford to give away medication?

As hospital costs mount, it is becoming increasingly evident that the beneficiaries of hospital services—the patients—must assume their fair share of the costs incurred. For this to occur, the hospitals must be able to account scrupulously, either to the patients or to the various prepaid hospital plans, for all services and medication.

Old-style injections too complicated

Because accounting and billing for medication withdrawn from multidose vials has been so difficult and time consuming, many hospitals have virtually been forced to write off the cost of common injectables or, at best, to estimate them. Yet it is clear that few hospitals can afford to give away medication or to rely on estimates, which are often unacceptable by the prepaid plans.

TUBEX lets you charge fairly

The TUBEX system provides individual, unitized doses of medication in tamper-proof cartridge form. It's an easy matter to keep track of medication dispensed and administered. *You know just what each patient received, and precisely how*

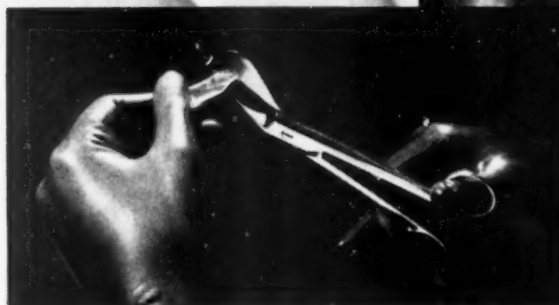
much. And you can charge accordingly, with unassailable fairness.

The need to charge accurately and as completely as possible is being met by the TUBEX system in more and more hospitals across the nation. Typical of the accolades the system has won is the following, excerpted from *The Bulletin of the Parenteral Drug Association*:

The charge made to the patient should include all services rendered. When most of these services are built into the product by the supplier—guaranteed identified contents and dosage, guaranteed sterility, plus simplified record keeping and control—and included in a single purchase price paid to the supplier, there is no problem in justifying the charge to the patient. It is a charge that can easily be backed up by records, and it does not strain the credulity of any investigator.—Crohn, L.B.: *The Bulletin of the Parenteral Drug Association*, p. 23, March-April, 1960.

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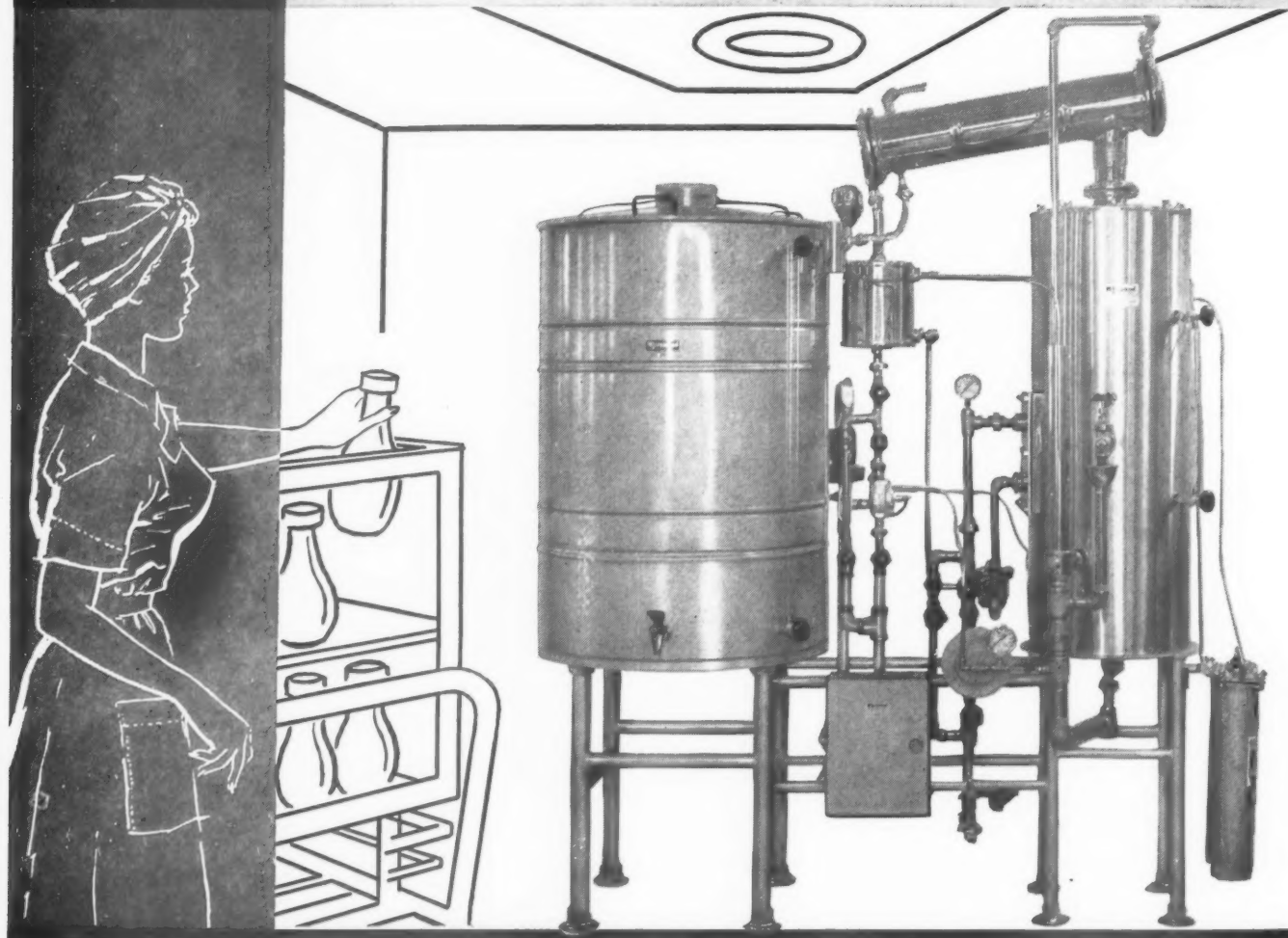
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1. Simeckova, M.; Shaw, W.; Pool, E., and Nichols, E. E.: Numorphan in labor, *Obst. & Gynec.* 16:119, July, 1960. 2. Snow, D. L., and Sattenspiel, E.: A report on Numorphan in obstetrics, presented at the Congress of the Pan American Medical Association, Mexico City, May, 1960.



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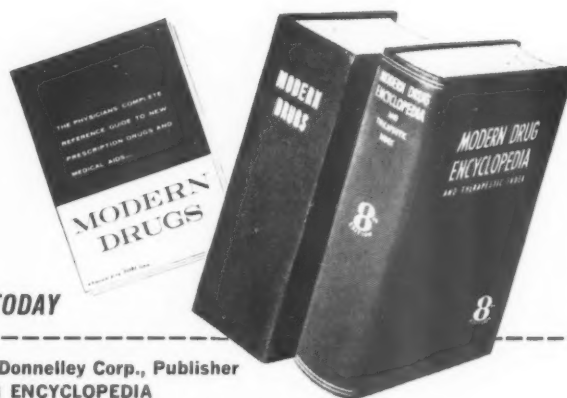
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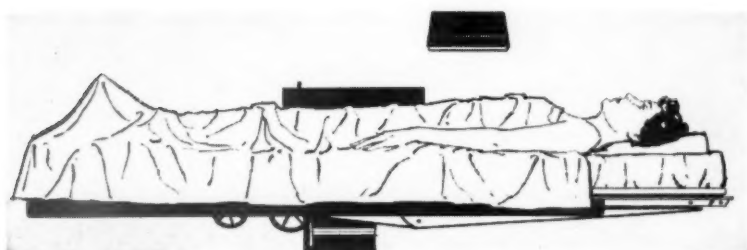
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Now available in new single dose, 2 ml. disposable sterile, nonpyrogenic syringe for greater convenience in administration. Packaged with sterile needle as single unit. Each 2 ml. syringe contains 250 mg. per ml. of d-pantothenyl alcohol.

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Northern California Society

Members of the Northern California Society of Hospital Pharmacists met for their 145th meeting at the University of California Medical Center on February 14. President Charles Jackson called the meeting to order at 8:15 P.M. and introduced the guest speaker, Dr. E. C. Jorgensen of the University of California School of Pharmacy. Speaking on hypocholesteremic agents, Dr. Jorgensen gave a brief description of heart disease and the role which cholesterol plays in it. After illustrating the biosynthesis of cholesterol, he mentioned several drugs that would interfere with this synthesis. Dr. Jorgensen concluded that although there were many drugs showing hypocholesteremic activity, there are also a great number of side effects associated with them. He stated that we are making progress in the field; however, we still do not have the complete answer to the problem.

A short business meeting followed the lecture and included announcements regarding plans for the Institute to be held in San Francisco, and the meeting of the Association of Western Hospitals in April.

Southern California Society

Mr. Chester Bazel of the Regional Center of the Veterans Administration in West Los Angeles was installed as president of the Southern California Society of Hospital Pharmacists for 1961 during a dinner meeting held at the Fog Cutters Restaurant in Hollywood on Wednesday, January 11.

Mr. Wendell T. Hill, chief pharmacist at the Orange County Hospital and the outgoing president of the Society, introduced Mr. Bazel, a graduate of the Ohio State School of Pharmacy, who has completed a Residency in Hospital

Chester Bazel (left) is installed as president of the Southern California Society as Wendell T. Hill presents the gavel to him



Pharmacy at the V.A. Center in Los Angeles and received a Master's Degree in Hospital Pharmacy from the University of Southern California School of Pharmacy. At present he is chief of the Center Section Pharmacy at the V.A. Center.

The topic "Legislative Outlook for Pharmacy in 1961" was discussed by the guest speaker of the evening, Mr. Donald D. Doyle, former state assemblyman and presently legislative advocate and Sacramento representative of the Pharmaceutical Institute.

Mr. George O. Baird, retiring secretary of the Southern California Pharmaceutical Association, and Mrs. Baird, and Mr. Cecil Stewart, executive secretary of the California Pharmaceutical Association, were special guests.

The other officers for 1961 who were installed at the meeting are: *Vice-President* Eliseo Gutierrez of Inter-Community Hospital, Covia; *Secretary* Miss Catherine Taylor of Woodland Park Community Hospital, Woodland Hills; and *Treasurer* Francis R. Giannetti of Burbank Hospital.

Colorado Society

The annual banquet of the Colorado Society of Hospital Pharmacists was held on January 17, 1961 at the Cosmopolitan Hotel, Denver, Colorado.

Following a reception and dinner, Mr. Sam Kohan, master of ceremonies, introduced the guests. Included were representatives of the Mayor's office, the Colorado State Board of Pharmacy, the Colorado Pharmacal Association, the Denver Area Drug Association, University of Colorado School of Pharmacy, Colorado Society of Pharmacists, Colorado Hospital Association, Colorado Nursing Association, Colorado Medical Society, and the *Rocky Mountain Druggist*. Administrators and assistant administrators of hospitals represented by the officers were also guests.

Mr. Joseph LaNier was introduced and gave a summary of the accomplishments of the Society for the past year. The new officers were introduced and installed, at which time Mr. LaNier presented the gavel to Mr. Irvin Friesen, the new president.

Mr. Friesen outlined prospective projects for the new year. He appointed the following committee chairmen: *Finance*—Richard Smouse; *Membership*—Don Garber; *Education and Legislative*—Co-chairmen: Mrs. Helen Angel and Mrs. Jean Kennison; *Publicity*—Gloria Andueser; *Program*—Sam Kohan; and *Seminar*—Joseph LaNier.

Mr. Kohan introduced Miss Margie Gaasch, executive secretary, and expressed the appreciation of the membership for the time and effort she has given to the Society in the past.

Thanks were extended to Mr. Bob Friesen and Mr. Rob Brannon of E. R. Squibb and Sons who were hosts for the evening.

Maryland Association

Members of the Maryland Association of Hospital Pharmacists met at Marty's Park Plaza Hotel on February 2. A reception and dinner preceded the business meeting. Installa-

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tion of officers for the coming year was a highlight of the meeting. Elected to serve during 1961 are *President* E. W. Nollau, Women's Hospital, Baltimore; *Vice-President* Ursula Heyer, The Johns Hopkins Hospital, Baltimore, and *Secretary-Treasurer* Mary Connelly, Medical Health Center, Baltimore.

Michigan Society

The February meeting of the Michigan Society of Hospital Pharmacists was held in conjunction with the Central Michigan Society in Saginaw. Officers of both groups were introduced; then Mr. Charles J. Hartleib of the University of Michigan College of Pharmacy, presented a talk entitled, "New Concepts in Prescription Charging." A question and answer period followed which proved of interest to all in attendance.

Earlier, the Michigan Society had met jointly with the Michigan State Pharmaceutical Association, which was holding its annual Mid-Season Meeting on the same day. During this session there was a panel discussion on the topic "Resolving Mutual Areas of Dissension between Hospital and Retail Pharmacists." The panel consisted of two retail pharmacists, Mr. John Hollowell of Ann Arbor and Mr. Thomas Rich of Jackson; and two hospital pharmacists, Mr. John Kuebler, Henry Ford Hospital, Detroit, and Mr. Douglas Vivian, Hurley Hospital, Flint. The moderator for the panel was Dr. Alex Berman, professor, University of Michigan, College of Pharmacy. Following introductory statements and rebuttal by the panelists, the discussion was thrown open to the audience. Since the subject centered around outpatient dispensing, the ensuing questions and answers provided lively interest.

This was the first time the Michigan Society had met jointly with the Michigan State Pharmaceutical Association, and the meeting turned out to be successful. Both organizations feel this resulted in a big step toward unified pharmacy in Michigan. In fact, plans are already being formulated for a second meeting of the two groups.

Akron Area Society

The Akron Area Society of Hospital Pharmacists met at Barberton Citizens Hospital in Barberton on February 14. Nineteen members of the Akron Area Society were welcomed by the assistant administrator of Citizens Hospital.

Business included routine reports, information on the Student Project which will be held May 9 and 10 and participation in the high school project. Also, an announcement was made regarding the possibility of a second meeting with the Summit County Pharmaceutical Association and possible program suggestions. A motion was made to participate in this joint activity and a committee was appointed to work out the program.

Announcement of plans for the A.Ph.A. Convention and the ASHP Annual Meeting was made and Mrs. Jeanne

Sickafoose was named delegate from the Akron Area Society to the ASHP House of Delegates. Others from the group attending will be Paul Dickerson and John Gowan.

Announcement was also made for plans for the Ohio Society of Hospital Pharmacists which will meet during the first week of April with the pharmacy section meetings on April 4 and 5. "Facts and Figures," will be the subject of a discussion at this meeting by Mrs. Mary Morgan and Russ Lovell.

Included also on the program for the February 14 meeting was a movie on the uses of Robaxin.

Oregon Society

The Oregon Society of Hospital Pharmacists met on January 11 at Holladay Park Hospital in Portland. Business transacted included discussion of final plans for the tour of Oregon hospitals for pharmacy students at Oregon State College, scheduled for February 24.

The program provided an informal discussion on current problems facing hospital pharmacy.

Eastern Pennsylvania Association

Forty-five pharmacists representing twenty-five hospitals in Eastern Pennsylvania attended the January meeting of the Eastern Pennsylvania Hospital Pharmacists Association. Those in attendance were most receptive to the two outstanding speakers of the evening—Mr. Joseph Oddis, Secretary of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, and Mr. George B. Griffenhagen, Director of Communications, American Pharmaceutical Association, both of Washington, D. C. Mr. Thomas A. Manzelli, president of EHPHA, presided at the meeting.

The two speakers enumerated the great strides made by pharmacy's two national organizations, the A.Ph.A., and its affiliate the ASHP.

Several reprints from the journals of both organizations were distributed to interested members as well as copies of *The Journal of Pharmaceutical Sciences*. This journal, formerly the *Scientific Edition, Journal of the American Pharmaceutical Association*, has just undergone a number of significant changes in appearance and makeup, along with a new title.

The speakers, in conclusion, pointed out that although active energetic leadership is a prerequisite to resolving pharmacy's problems, intelligent and active participation by members of the Association is essential.

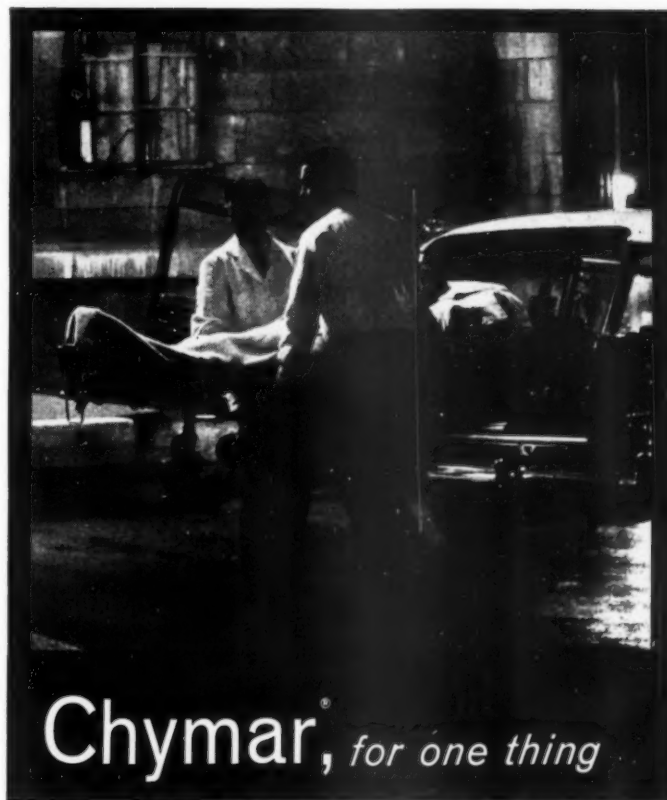
Mr. Manzelli based his concluding remarks on a statement made by President Kennedy in his inaugural address. "Ask not what your organization will do for you—ask what together we can do for our organization . . ."

Lederle Laboratories played host to the dinner portion of the meeting which was held at Stouffer's Restaurant in Philadelphia.

Western Pennsylvania Society

The Western Pennsylvania Society of Hospital Pharmacists held its annual banquet for installation of officers on January 28 at Stouffer's Restaurant in Oakland. The dinner was sponsored by E. R. Squibb and Sons. Newly installed officers of the Society are *President* Charles Cleveland, Citizens General Hospital, New Kensington, Pa.; *Vice-President* Sister M. Constantia, St. Joseph's Hospital, Pittsburgh; *Secretary* Carole Finelli, West Penn Hospital, Pittsburgh; and *Treasurer* William Sinclair, Allegheny Valley Hospital, Tarentum, Pa.

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Wisconsin Society

The third meeting of the Wisconsin Society of Hospital Pharmacists for the 1960-1961 season was held at Marquette University on January 20, 1961. As planned, the members gathered at "Mac's Shack" in the Dental School for doughnuts and coffee. They then proceeded to Room 113 where Sister Natalie, president, introduced the speaker.

Dr. Harold F. Hardman, R.Ph., Ph.D., and M.D. is associate professor at Marquette University School of Medicine. He spoke on "Changing Concepts of Pharmacology." Dr. Hardman elaborated the theory, *The Ionization Constant*, in technical detail. The most important factor in drug absorption is this ionization constant. The rate of absorption is determined by the pKa value.

Sister Natalie thanked Dr. Hardman for his lecture and expressed the feeling that the group had been well informed. They proceeded with the regular business meeting at this time.

The minutes of the October meeting were approved as published, and the Treasurer reported \$285.30 in the treasury.

Sister Natalie appointed Miss Thora Vervoren, chief pharmacist at Columbia Hospital, as a delegate to the Annual Meeting of the ASHP April 23-28, in Chicago. Mrs. McVey,

treasurer, was authorized to write the check for the expenses.

A motion was made by Miss Vervoren, and seconded, to sponsor three students to the Pharmacy Counseling Program for high school students interested in a career in pharmacy. This program is held in conjunction with the Pharmacy Management Institute in Madison on April 11-12, noon-to-noon. As pharmacists are attending their Institute, a separate program is conducted for these students and is designed to introduce them to the School of Pharmacy, the University, and to outline the many opportunities and careers our profession offers. The \$11.00 student fee covers two luncheons, the banquet, housing and breakfast in the University dormitories, and a ticket to Haresfoot. Among other activities scheduled for the students is a tour of the teaching and research facilities of the School of Pharmacy, attending a pharmacy class, and visiting Madison hospital pharmacies.

Mr. Henry discussed the problem of reusing disposable syringes and suggested that something should be done to make these syringes impossible to reuse because of the dangers of contagion to infectious hepatitis. Investigation on their usage and disposal should be initiated to keep the syringes out of public hands.

Sister Blanche expressed the need for the Society to have a Directory of Hospital Pharmacists. Sister Natalie appointed a committee to organize such a Directory including George Wright, *Chairman*, Deaconess Hospital; Thora Vervoren, Columbia Hospital; and William Benka, Milwaukee County, all located in Milwaukee.

Sister Natalie requested volunteers to work with her on the Manual for Small Hospitals. Hospital pharmacists or any pharmacist having experience with small hospitals, nursing homes, etc., without pharmacies, are invited to share their opinions in compiling this Manual.

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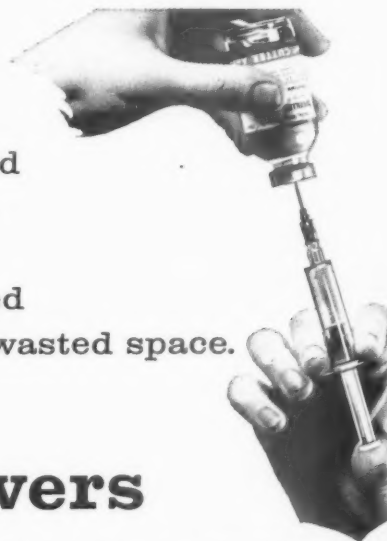
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Hospital Pharmacy *Notes*

No. 1 March / April / 1961

by Dr. Glen J. Sperandio

Dr. Sperandio is associate professor of pharmacy at Purdue University, West Lafayette, Indiana, where he teaches dispensing and hospital pharmacy and also directs graduate research in the areas of clinical pharmacy and product formulation. He is a member of the American Society of Hospital Pharmacists and a charter member and past president of the Indiana Chapter of the A.S.H.P. He belongs to the American Pharmaceutical

Association, the Society of Cosmetic Chemists, and other professional and scientific groups. Before his affiliation with Purdue, he had experience in retail pharmacies, hospitals, and industry; thus, his broad background has given him an understanding of the problems each segment of the profession faces. Dr. Sperandio and Eli Lilly and Company invite your comments, suggestions, and contributions.

THE HOSPITAL PHARMACIST'S PUBLIC RELATIONS

It is advantageous occasionally to review one's position, evaluate it, and make resolutions which, if followed, will improve the operations of the pharmacy department. Each time this is done, new opportunities are provided for doing a better job, and one can look to the future with renewed hope and expectations. Pharmacy, as a profession, can face the future in 1961 with more confidence than it has had in some years, and hospital pharmacy in particular can view its position with much satisfaction.

The internal structures of our national organizations have been strengthened, the educational programs for our students of pharmacy have been expanded, and communications between the various segments of our profession are being improved. One result which can be seen is the improvement in the public relations programs that are being developed to carry the story of the pharmacist to the public.

If the hospital pharmacist were to select only one area in which he might improve during 1961, this field—his public relations—should be first choice. It is one of the easiest, yet most neglected, of his activities. By the hospital pharmacist's public relations, we mean both intraprofessional and general public activities.

Much of a hospital pharmacist's success depends on

his public relations program. He must secure the respect and co-operation of nursing, medical, and service personnel, and he does it by projecting before their eyes a picture of himself and his department. His success within his institution is directly proportional to how well he does this. Of course, such an idea is not new, but it is one that bears repeating. For the pharmacist whose department has not made satisfactory progress during the past year, a critical review of his public relations program is in order.

Previous issues of "Hospital Pharmacy Notes" published by Eli Lilly and Company in *Tile and Till* have suggested ways of improving relations with nursing, medical, and administrative staffs and with the hospitalized patient. However, like charity, public relations begins at home. The liking and respect of one's employees radiate an atmosphere in the pharmacy and elsewhere that can be sensed by others. In effect, the employees of a pharmacy create the mood for all others who enter; they compose the background for the chief pharmacist. Public relations doesn't "just happen." To be effective, a public relations program must be planned . . . and it must be frequently reviewed and nurtured. Now is the time to improve your program—and don't forget to include the pharmacy employees themselves.

SCHEDULING FOR SUCCESS

Success is the ultimate objective of everyone who pursues any type of specialized training or education, and many means are employed to attain it. However, one fact is evident; success is achieved only through conscious effort and is maintained only by continuous striving. One factor which contributes to success in hospital pharmacy is the intelligent planning and profitable use of one's time.

Many pharmacists have developed the habit of procrastination to such an extent that the statement "I'd do it, but I just don't have time" has become a very convincing excuse which greatly impairs their chances for success. A pharmacist may know that he would improve his service to his employer if he put forth a little extra effort or completed a job that was necessary but not particularly urgent. However, since there is often a tendency to postpone the task, it is seldom completed.

The best method of completing postponed jobs—and thus bringing success a little closer—is to budget one's time in the same manner that money is budgeted. A

pharmacist prepares a financial budget for his department's funds, so why not a similar allocation of his working hours? The hardest part of doing extra jobs is getting started. Once action is initiated, procrastination is overcome, and progress is at least made easier. Here, then, is this month's suggestion:

Prepare an achievement schedule for one calendar year. Make a list of the improvements that will give maximum efficiency to your pharmacy service—those you have been meaning to make but for which you have never found time. Consider the number of hours each will require, and budget your time for one job a month for the next year. Note these tasks on your desk calendar so that you are reminded daily that you have committed yourself to a definite schedule. Then, as each month comes along, complete the "budgeted" assignment. Each succeeding month will make the project easier. At the end of the year, you will have a balanced "time budget" and will have realized definite accomplishments. Use the schedule set up for you below.

Start Issuing
Pharmacy Bulletin

Prepare Operations
Manual for Pharmacy

Attend
Hospital Institute

Attend Meeting of
Local Chapter ASHP

Give Seminar for
Hospital Staff

Prepare a Formulary

Revise and Reactivate
Formulary

Give a Prepared Talk
to Lay Group

Join the
A.Ph.A. and ASHP

Dispose of Old
and Discontinued
Narcotics

Prepare Written
Statement of Policy

Review Inventories
on Nursing Stations

Clean and Reorganize
Pharmacy Storeroom

Prepare Financial
Report on Pharmacy

INSTRUCTIONS:

The boxed items above are essential activities for the hospital pharmacist. Clip out those items which fit your situation and paste one on each month of the calendar. Then place the calendar on your desk or on the wall where you will see it daily.

ACHIEVEMENT SCHEDULE

January	February	March
April	May	June
Attend National Meeting A.Ph.A. and ASHP		
July	August	September
October	November	December

PORTRAIT OF A PHARMACIST—I

No one was in the pharmacy, but a nurse was standing at the door and tapping impatiently on the counter. "If you're looking for _____," she said, "you'll probably find him in the cafeteria; and please tell him that I'm waiting here for the B₁₂ Dr. _____ ordered."

He was sitting at a table by himself in the cafeteria, leisurely enjoying a cup of coffee and a cigarette. He acknowledged that he was the hospital pharmacist and invited me to join him. When I gave him the nurse's message, he made a face and grunted, "Somebody's always wanting something. There's no great hurry."

My original intention of writing an article about this man as a typical hospital pharmacist had already been abandoned, but I decided to make the most of my visit and asked whether I could see the pharmacy. Walking down the hall, I thought to myself that here was a pharmacist who looked like anything but a professional man. His red-and-blue-striped sport shirt was open at the neck, and the sleeves were partially rolled up. He obviously hadn't shaved that morning, and his hair was not combed. His trousers were wrinkled, and his shoes actually had dried mud on them and were sadly in need of a shine.



Entering the pharmacy, he opened a cabinet, slid a package along the counter to the nurse without speaking to her, and sat down at a table covered with papers and books. In answer to my questions, he told me that he did not belong to any professional organizations ("They don't give me anything for my money but some magazines that I don't have time to read.") and that he did not bother to attend professional meetings because his administrator wouldn't give him time off. (No, he hadn't asked, but he *knew* that the pharmacy was never given a chance for any kind of improvement.) He felt that the administrator was always criticizing the pharmacy's operations but never doing anything about adding further personnel to help run it properly. The pharmacist seemed glad to find someone who would listen to his complaints, and he had many. He was particularly bitter about the supervisor of nurses—"a witch that nobody can get along with"—and he was unhappy because the medical staff continually wanted new drugs that he didn't yet have in stock. He had no formulary (no time to fix one up!), and the most recent reference book in his pharmacy was the U.S.P. XIII.

"It's about time to close," he said, "and if there's one rule I have, it's always to close on time. I don't get paid overtime."

PORTRAIT OF A PHARMACIST—II

He was working on some papers, but he looked up and smiled as I came to the counter. "Be with you in a minute," he said, and turned back to his work. The pharmacy was small, but it was neat and apparently well organized. This pharmacist wore a white shirt and a tie and had on a crisp white drug jacket. He was clean-shaven, well-groomed, and emanated an air of professional competency. He even walked like a professional man as he came to the front of his pharmacy.

I introduced myself and explained that I was interested in his ideas about hospital pharmacy. He excused himself to answer the telephone. He wrote something down, thanked the caller, and then went to the refrigerator and took out a vial of medication and processed it as an order before he came back to me. Inquiry revealed that he belonged to both national and local hospital pharmacy associations, although he wasn't able to attend all the meetings. He worked overtime occasionally and could use a little more help but had not yet asked his administrator for it; he was waiting until plans for an addition to the hospital were crystallized. He enjoyed his work and got along well with members of the other professional staffs. He was revising the formulary and met regularly with the therapeutics committee.



This pharmacist was proud of his hospital and optimistic about his job. He interrupted his talk with me several times to wait on people who came to the pharmacy, and it was apparent that he was liked and respected by his fellow workers. A detail man came in with some literature that the pharmacist had evidently requested, and a moment later an intern stopped by to talk to him. I took my leave, feeling that here, in truth, was hospital pharmacy in action.

A senior pharmacy student who is enthusiastic about hospital pharmacy posed for the pictures on this page. They are intended to show what a difference a little personal pride and professional attitude can make in the impression that others receive.

The reader is now asked to write a column called "Portrait of a Pharmacist—III." This portrait will be yours. What is it like?



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Zimmerman, K., et al.: The Use of Darvon Compound after Anorectal Surgery, *Am. J. Surg.*, 99:316, 1960.

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- References:** 1. Gordon, D. M., and Ehrenberg, M. H.: *Am. J. Ophth.* 38:831, 1954.
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A. J. Aballi, V. L. Banus, S. de Lamerens and S. Rozengvaig, *J. Dis. Child.*, 97:524, 1959. And abstr. in *J.A.M.A.*, 170:2249, 1959 and *Nutrition Rev.*, 17:229, 1959.

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HOSPITAL NOTES

a quick review to help you keep posted
on atherosclerosis, cholesterol, and MER/29

91% of MER/29 PRESCRIBERS REPORT SUCCESS: Physicians are finding MER/29 effective in reducing cholesterol levels in patients with hypercholesterolemia, atherosclerotic heart disease and generalized arteriosclerosis. A recent projection estimates that 16,000 doctors prescribed MER/29 during one month alone—with 9 out of 10 obtaining satisfactory results... **BLOOD CHOLESTEROL OF SIGNIFICANT PROGNOSTIC VALUE:** According to Dr. Ancel Keys, serial blood cholesterol determinations have been underestimated as prognostic measures. Screening and epidemiological studies indicate that they may be useful in identifying potential coronary disease risks. (Keys, A., *et al.*: Proc. Soc. Exper. Biol. & Med. 104:452, July, 1960)... **HEART ASSOCIATION TIES CORONARIES TO CHOLESTEROL:** An A.H.A. committee headed by Dr. Irvine H. Page has publicly recommended dietary changes aimed at lowering cholesterol because "reduction in blood cholesterol... may lessen the development or extension of atherosclerosis and hence the risk of heart attacks or strokes." (American Heart Association, news release, Dec. 10, 1960)... **MER/29 FAVORED OVER OTHER CHOLESTEROL-LOWERING AGENTS:** According to a two-year study in 100 patients, MER/29 seems to suffer from none of the usual disadvantages of cholesterol-lowering agents. Bile-sequestering drugs, thyroxine, nicotinic acid, proteolytic enzymes, and lipases have often proved either ineffective or toxic. MER/29 reduced cholesterol in 87% of the 100 patients without toxic effect as judged by both clinical and laboratory criteria. (Lisan, P., *et al.*: J. Lab. & Clin. Med. 56:924, Dec., 1960.)

MER/29... the first safe cholesterol-lowering agent to inhibit the formation of excess cholesterol within the body, reducing both serum and tissue cholesterol levels.

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Journal Binders Available

A loose-leaf binder for the AMERICAN JOURNAL OF HOSPITAL PHARMACY is now available from The Hamilton Press, Hamilton, Illinois. The new binder has been designed for THE JOURNAL and will hold the twelve issues satisfactorily. The binder is brown in color and "American Journal of Hospital Pharmacy" is embossed on it in gold. The binder is 9 by 12¼ inches with the spine measuring 4 inches.

The cost of the binder is four dollars (\$4.00) each and orders may be directed to The Hamilton Press, Hamilton, Illinois.

Scaph

newsletter

ELEVENTH OF A SERIES WITH SIGNIFICANT SUGGESTIONS FOR CONTROLLING CROSS INFECTIONS

EVERY day as your letters come in giving us the opportunity to help you in some area of infection control, we've been newly impressed with the increasingly evident desire for information on specific environmental control measures tailored to fit specific areas of the patient's environment. Since this environment includes the patient's complete hospital surroundings—the air around him, his clothing, the utensils he touches, the room furniture, the hospital floor, the people whom the patient contacts, and the people and instruments who contact him—practical applications for Amphyl®, O-syl®, and Lysol® disinfectants, and Tergisyl® detergent-disinfectant are many. Yet, getting the information you want to you in a form practical for evaluation by groups, such as your Committee on Infections, as well as practical for use by those responsible for carrying out control measures, is a project we've been working on for some time.

Now, we are happy to announce our new infection control kit titled, "Contamination Control That Works...in Your Hospital." We call it a kit because in a conveniently indexed file jacket you will find there is a varied collection of pertinent material. Current reprints are accompanied by completely new brochures covering the "how, where, and when" of dependable contamination control. Specific suggestions are given for general housekeeping, isolation units, O.R. and recovery, O.B. and maternity, nursery and pediatrics, emergency and outpatients, and laundry. And, of course, bacteriologic data confirming the broad spectrum activity of all L&F disinfectants is shown. (As you probably know, they are widely microbicidal, including staphylocidal, pseudomonacidal, tuberculocidal, and fungicidal.)

Your contamination control kit is ready. Please let us know where you would like to have it sent. If you would like each member of your Infections Committee to also have a kit, we will be glad to send multiple copies individually addressed.

Are you becoming alarmed over the increasing number of patients with hepatitis? Since this virus thrives in blood and feces of infected patients, instruments and utensils used on or by them, and not carefully handled or properly sterilized, are potential spreaders. Dr. Alexander D. Langmuir, chief epidemiologist of the Public Health Service's Communicable Disease Center, Atlanta, has warned that the peak incidence of 41,000 cases reported in 1960 may go as high as 60,000 this year. For the first few weeks of the year, USPHS-HEW reports already show incidence 89% above the same period last year and 189% above the same period in 1959.

L&F Instrument Germicide can be used in a practical way to fight the spread of hepatitis. Here's how—heat L&F Germicide to the boiling point, immerse instruments and hold at boiling point for 20 minutes. This destroys the

viruses causing serum and infectious hepatitis, as well as bacterial spores. Boiling with plain water should not be relied upon to effect complete sterilization even if carried out for several hours. Would you like our new folder on Instrument Germicide? If so, please write us.

"If one is to control infections in a general hospital, one must control the environment of the patient." In the Journal of the Tennessee State Medical Association, December, 1960, Dr. J. L. Farringer, Jr., introduces his report on practical answers to infection control with this pertinent comment. Attention to details of general housekeeping are cited as very important in reducing the reservoirs of bacteria within the hospital. For instance—germicidal laundering of mops after each day's use, frequent changes of mop water, and use of a disinfectant-detergent are recommended. In this hospital, L&F Tergisyl was found satisfactory for these purposes as well as for the flooding and wet vacuum pickup technic for disinfecting operating room floors. Blankets were reserved for individual patients and routinely disinfected with Amphyl® during the laundry process. Would you like a reprint?

When two London physicians introduced staphylococci in varying dosages into artificial skin lesions in man, the experiments soon had to be discontinued because of septic lesions, such as boils and abscesses, developing on other parts of the subjects' bodies. (The Lancet 2:1373, December 24, 1960). It was shown that as few as fifteen seeded organisms multiplied rapidly to form a septic lesion. Also, test subjects became nasal and perineal carriers.

Have you started using Amphyl® Spray—our new spray-on spot disinfectant and space deodorant? This handy 16-oz. spray-on form of Amphyl is catching on fast. If mildew is a problem for you, you'll surely want to try it. Write us for the descriptive folder. You'll want several cans on every floor to supplement other disinfection procedures and take care of malodors at once.

If you have a particular infection control problem plaguing you, perhaps we can offer a suggestion. Our research laboratories and technical advisers are ready to help and I, personally, hope to hear from you.



Robert E. Dickens
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Dear Sirs:

Further Comment on Law Column

DEAR SIRs: Thank you for referring to me the letter of Mr. Jack Cooper (Ciba Pharmaceutical Company) regarding my column on "house quality" approach in the merchandising of single drug entities.*

I agree, the letter should be published in the "Dear Sirs" column of *THE JOURNAL* since it must have been the intention of the writer that it be given publicity. Furthermore, there are pros and cons to all issues and hospital pharmacists, I am sure, will appreciate analyzing factually the original article and this rebuttal.

As for my commenting on the letter's contents, while I appreciate this courtesy, I know the hospital pharmacists of the country are quite capable of evaluating my statements and this rebuttal without assistance from me. You may publish this letter with the Cooper letter if you so desire.

GEORGE F. ARCHAMBAULT,
Contributing Editor

The Law of Hospital Pharmacy
American Journal of Hospital Pharmacy
Letter received October 20, 1960.

EDITOR'S NOTE: See Dr. Archambault's column, "The Law of Hospital Pharmacy," *THIS JOURNAL* 17:502 (Aug.) 1960 and Mr. Cooper's Letter, *ibid*: 17:675 (Nov.) 1960.

"Congratulations" on Literature Number

DEAR SIRs: . . . Congratulations on the splendid manner in which you are developing the *AMERICAN JOURNAL OF HOSPITAL PHARMACY*. The special literature number is extremely important. I am glad that you have worked this along so well.

I am also glad that you are promoting general cultural interest of the sort represented by Glenn Sonneck's article on "The Pharmacist as a Book Collector."

CHAUNCEY D. LEAKE, *Chairman*

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DEAR SIRs: Congratulations on another edition of the "Guide to Information Sources." This edition too

will be useful both for reference and staff training purposes in our library . . .

W. A. SOUTHERN, *Librarian*

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North Chicago, Illinois

DEAR SIRs: Congratulations on the January 1961 issue of *AMERICAN JOURNAL OF HOSPITAL PHARMACY*. It gives the subject of pharmacy literature excellent coverage and could be used as a prototype for special literature numbers for all paramedical groups. Your profession is fortunate in having so many library-literature oriented members.

HELEN T. YAST, *Librarian*

American Hospital Association
840 North Lake Shore Drive
Chicago 11, Illinois

DEAR SIRs: I want to congratulate you on the splendid special Literature Number of the *AMERICAN JOURNAL OF HOSPITAL PHARMACY* which we received recently. This is an outstanding addition to the literature of hospital pharmacy and I know that it will be very effectively used.

(Mrs.) ELIZABETH W. JOHNSON, *Librarian*
Philadelphia College of Pharmacy
and Science
Philadelphia, Pennsylvania

DEAR SIRs: Let me extend congratulations to you, the associate editor, the authors, and others responsible for the January (1961) issue of *THE JOURNAL*. Although each issue of *THE JOURNAL* seems to be a special one in itself, this Literature Number truly earns the title of "special."

Besides congratulations, there is also thanks for this invaluable addition to the field of hospital pharmacy literature. Certainly the amazing growth of our profession is synonymous with the growth of our literature. There is deep pride for our *JOURNAL* as it records and stimulates that progress.

EDGAR N. DUNCAN, *Chief*

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Feb. 1961 (P-493)

New Products Parade 1960

► NEW DRUG PRODUCTS continue to enter the market at an almost unbelievably fast pace. For example, Paul de Haen reports that 109 firms introduced 311 products while *pharmIndex* reports that 232 firms introduced 718 products during 1960. The larger figures reported by *pharmIndex* include more manufacturers with less than national distribution.

During the past six years, Paul de Haen has prepared an annual review of drug products introduced. This is a valuable contribution since it helps one to obtain a perspective of trends in drug marketing. The following comments are taken from Paul de Haen's review entitled "New Products Parade 1960."

During the last twelve months the United States pharmaceutical industry introduced for use by the physician 311 new products, approximately the same number as in 1959 (see table). Among these, however, were only 45 new chemical entities, as compared to 63 in 1959. Upon further analysis it is interesting to note that the decrease was primarily in the group represented by derivatives of presently known chemical structures and new salts of old products. New original molecules developed in this country actually increased from 16 to 19. Among these 19 products were four preparations for which a manufacturer had obtained a license either from another manufacturer or from an individual inventor. In this connection we must also keep in mind that the number of new chemical entities marketed in a given year is no true measure of research activities, be-

cause only those products can be made available for use by the physician which have been assigned an effective New Drug Application by the Food and Drug Administration. Concomitantly, by no means do all new chemical entities developed in Europe find their way to the American market.

The following chart offers a breakdown of new chemical entities introduced in 1960, the general classification of these products, and their place of origin.

	DEVELOPED IN U. S. BY:			
	MANUFACTURERS THEMSELVES	OTHERS	DEVELOPED IN FOREIGN COUNTRIES	TOTAL
New Original Products	15	4	11	30
Derivatives of Currently Known Structures	6	1	3	30
New Salts of Old Products	1	3	1	5
	22	8	15	45
	48.9%	17.8%	33.3%	100%

Commenting on "The Source and Use of New Chemical Entities," Paul de Haen states:

An annual review of new products can only enumerate the most recent events; it does not interpret their broader meaning. I have therefore analyzed the new product progress of the twenty largest pharmaceutical firms for a period of three years. This analysis also provides some interesting data.

Pharmaceutical Products Introduced Nationally 1951 - 1960

	NUMBER OF FIRMS	TOTAL NEW PRODUCTS	NEW SINGLE CHEMICALS	DUPLICATE SINGLE PRODUCTS	COMPOUNDED PRODUCTS	NEW DOSAGE FORMS
1951	86	321	35	74	212	120
1952	89	314	35	77	202	170
1953	107	353	48	79	226	97
1954	101	380	38	87	255	108
1955	124	403	31	90	282	96
1956	126	401	42	79	280	66
1957	127	400	51	88	261	96
1958	126	370	44	73	253	109
1959	106	315	63	49	203	104
1960	109	311	45	64	202	98
		3568	432	760	2376	1064
New Dosage Forms		1064				
		4632				

New Single Chemicals—indicates products which are new single chemical entities not previously known, and developed by one manufacturer.

Duplicate Single Products—products such as dexamethasone or griseofulvin which are put out by various manufacturers.

Compounded Products—any product having more than one active ingredient.

New Dosage Form—if a product has originally been marketed in tablets and is now offered in ampuls, suppositories, etc., the latter are considered new dosage forms.

Source: Paul de Haen

6

THE



THE FORMULATION OF RADIOACTIVE KRYPTON⁸⁵ FOR INTRAVENOUS USE

by WILLIAM H. BRINER

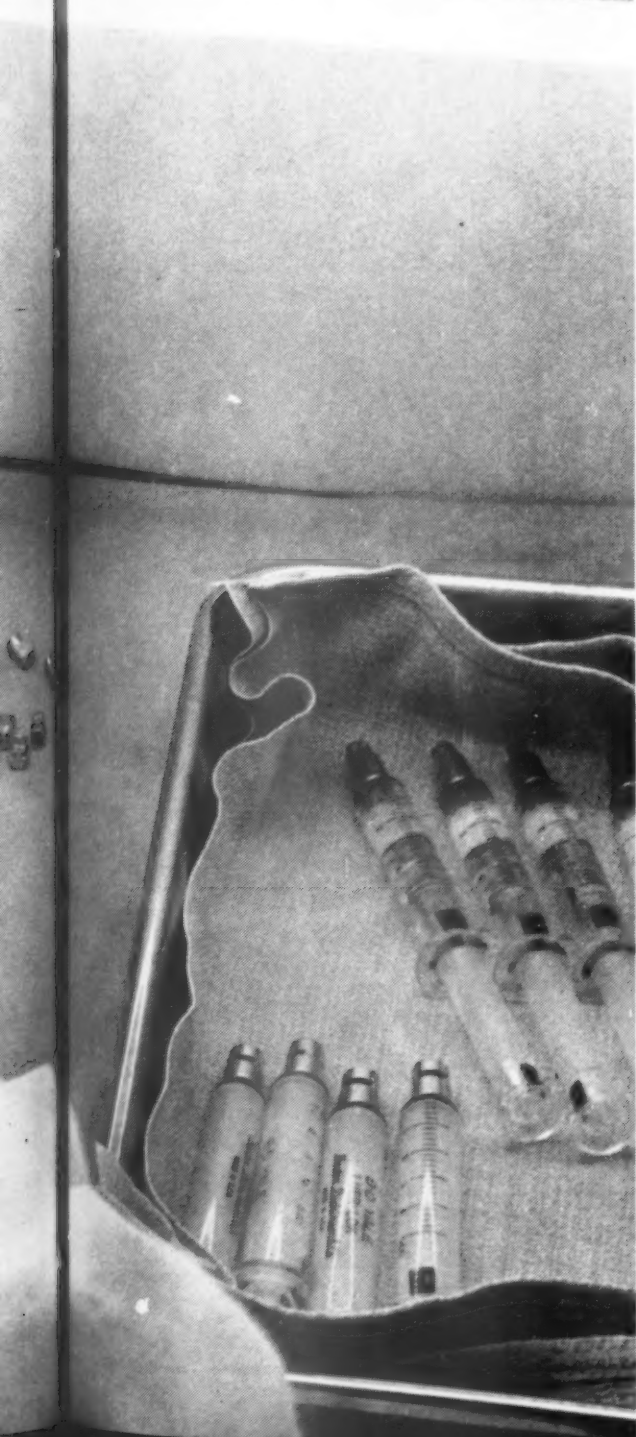
► ONE OF THE MORE PROMISING DIAGNOSTIC procedures in the cardiovascular field is the detection and characterization of circulatory shunts utilizing the radionuclide krypton-85. Within the past five years, there have been numerous articles published in professional journals outlining in some detail the use of this material, both by the inhalation and the parenteral routes of administration. A few of the more recent of these references are cited.^{1,2,3,4,5} However, relatively little has appeared in the literature concerning the manner in which this foreign gas may be formulated pharmaceutically into a dosage form suitable for intravenous use. In view of the widespread interest manifest in this procedure by cardiologists and heart surgeons, and because, as yet, there is no routine commercial source available for this radiopharmaceutical product, it is necessary for hospital staffs to prepare this material locally until such time as it becomes available from the pharmaceutical industry.

Physical and Radiochemical Properties

Krypton-85 is a gas produced as one of the fission products which result from the slow neutron fission of U²³⁵. It has a half-life of 10.27 years, and a decay scheme which includes beta particles of 0.15 Mev. (0.65%) and 0.695 Mev. (99+%), and a gamma photon of 0.54 Mev. which occurs 0.65 percent of

WILLIAM H. BRINER, is Chief, Radiopharmaceutical Service, Pharmacy Department, Clinical Center, National Institutes of Health, U. S. Public Health Service, U. S. Department of Health, Education and Welfare, Bethesda 14, Maryland.

Packaging of Kr⁸⁵ Injection in
Ultraviolet Hood



the time.⁶ While this is the most commonly used branching ratio for this radioisotope, a recent study⁷ indicates that a gamma ray of 0.517 Mev. occurring 0.46 percent of the time may be a more correct value for the gamma component of this decay scheme. The solubility of krypton gas in water is 11.0 cubic centimeters per 100 ml. at 0°, 6.0 cubic centimeters per 100 ml. at 25°, and 4.67 cubic centimeters per 100 ml. at 50°.⁸

Discussion

The krypton-85 used by this facility is obtained from Oak Ridge National Laboratory, Oak Ridge, Tennessee, as a processed, carrier-free isotope. The gas is shipped in a returnable metal cylinder (see Figure 1), from which it must be transferred to a suitable vessel of known volume for containment and subsequent use. Figure 2 illustrates the type of container in use at this institution. A 1000 ml. thick-walled filtering flask^a was sealed at the top, and a glass stopcock was fused to the side-arm of the flask by a glass blower. The volume within the sealed flask was then determined by weighing the flask dry; it was then filled to maximum capacity with distilled water to obtain the weight of the flask and water. The accuracy of this type of relationship of mass and volume of distilled water is well within the limits of probable error in other portions of this procedure. The flask, found to contain 1200 ml. when filled to the sealed top, was then emptied and dried. Then, through a system of tubing, adapters, and stopcocks, the pressure within the flask was reduced to the value of 1 micron, as measured with a McLeod gauge, using a suitable vacuum pump. Finally, by attaching the gas cylinder, containing one Curie of krypton-85 in 10 ml. at a pressure of approximately 80 mm. above atmospheric, to the evacuated flask, the krypton was easily transferred into the flask by means of the pressure differential in the system. The stopcocks on the flask were then closed, and the cylinder detached from the system. The pressure within the flask was then allowed to return to atmospheric pressure by "bleeding in" the air from within the fume hood, in which the transfer was affected, through the stopcocks. When equilibration was obtained, the stopcocks were again closed and the flask stored at 25°. All fittings and stopcocks used in the system, as well as all syringes subsequently used to withdraw aliquots of the gas from the flask, were "sealed," or lubricated, with a mixture of Aquaresin^b 50 percent in glycerin to prevent leakage of the gas.

The activity within the flask was then calibrated, using a Lauritsen electroscope and a radium standard. Appropriate corrections for the percent occurrence of the krypton-85 gamma photon must, of course, be applied. This total activity, then, can be related to a krypton-85 concentration per unit volume by employ-

ing the previously determined 1200 ml. volume factor. In passing, it should be stated that calibrations performed in this manner have approximated 95 percent of the total activity estimated by the supplier to be present in the metal gas cylinder prior to the transfer procedure. Having obtained this bulk calibration, or assay, withdrawals can be made from the bulk container in the volumes required for individual batches.

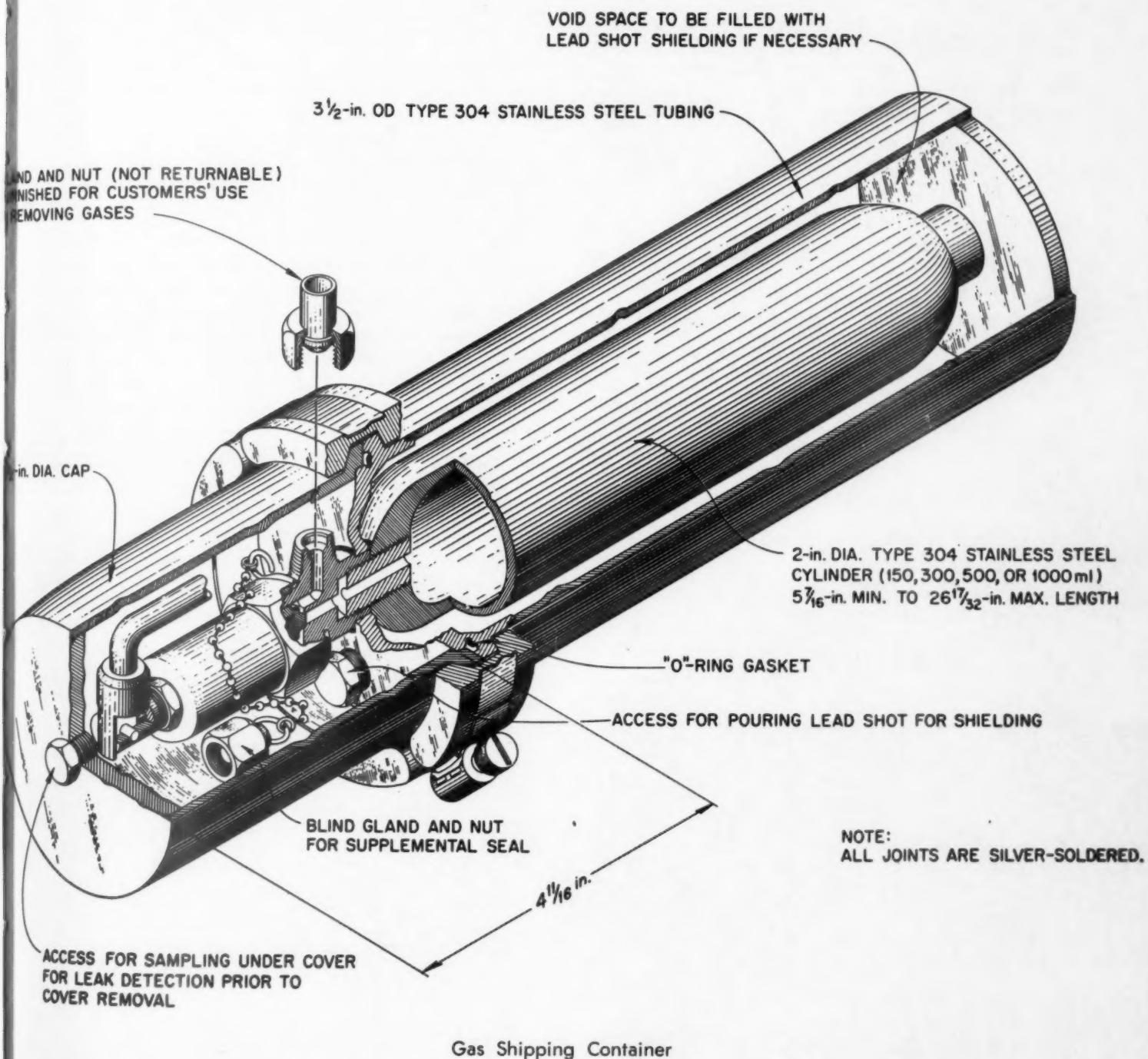
Formulation

When krypton-85 is added to a sealed container, into which has been placed a known volume of normal saline, the gas will distribute itself between the saline and the air above the saline in a ratio of approximately 1:20. Therefore, the volume of krypton-85 to be withdrawn from the bulk flask may be computed from the following equation:

$(\text{Total batch volume} \times C_{rp}) + (\text{Volume Kr}^{85} \times 20C_{rp}) = \text{Volume Kr}^{85} \times \text{SpA Kr}^{85}$, in which C_{rp} is the concentration (in $\mu\text{c Kr}^{85}/\text{ml}$) desired in the finished product, and SpA Kr^{85} is the concentration of Kr^{85} (in $\mu\text{c}/\text{ml.}$) in the bulk flask. In this equation, the left hand side represents the conditions in the sealed vessel after the volume of krypton-85 gas has been added, and an equilibrium established between the krypton-85 dissolved in the normal saline and the krypton-85 in the air above the saline. This rather cumbersome equation can be simplified mathematically to the following relationship:

$$\text{Volume Kr}^{85} \text{ stock gas required} = \frac{\text{Total batch volume} \times C_{rp}}{\text{SpA Kr}^{85} - 20C_{rp}}$$

In formulating individual batches of this product, a volume of distilled water equivalent to the volume of krypton-85 stock gas required for the batch is introduced into the flask containing the radionuclide. Then, using a syringe lubricated with the Aquaresin-glycerin mixture, this volume of krypton-85 is withdrawn from the flask and immediately sterile-filtered, through a membrane filter of 0.45 micron maximum pore size^c, into a sterile disposable plastic container^d of a type commonly used in blood banks, and which contains the total volume of Sodium Chloride Injection U.S.P. indicated by the size of the batch. Figure 3 illustrates the syringe, membrane filter with adapter, and the disposable plastic container. After equilibrium between the krypton-85 above the fluid and that dissolved in the fluid is obtained by occasional gentle agitation over a 15 minute period, the container is suspended with the stopcock extending in an upward direction, and the air-krypton-85 above the fluid level is expelled by opening the stopcock and rolling the plastic container upward until the fluid appears at the outlet of the stopcock. At this point, the stopcock is again closed, and the plastic container allowed to unroll. The walls



of the plastic container above the level of the fluid remain in a collapsed position. The plastic container is then suspended in an inverted position, with stopcock downward, and individual sterile syringes lubricated with Aquaresin-glycerin are filled by attachment to the stopcock. Immediately after filling, each syringe is capped with a sterile syringe cap^e to prevent leakage and preserve sterility. Figure 4 illustrates the hood in which the sterile-filtration and packaging of the krypton-85 take place. This hood is a radioisotope glove box^f which has been modified by the addition of two ultraviolet lamps of 2537Å wave length^g, spaced in such a manner as to provide complete coverage of the enclosed volume of the hood, each of which provides an ultraviolet density at a point 1 meter from the arc axis of 11.6-14.8 UV $\mu\text{W}/\text{cm}^2$ after 100 hours of operation.⁹ The hood ultraviolet lights are illuminated for a minimum period of 30 minutes prior to the start of the procedure in order to assure a sterile field of operation. In addition, the hood is maintained at a negative pressure with respect to the laboratory air, in order to prevent krypton-85 discharge into the laboratory area in excess of the maximum allowable concentration of this isotope of 1.0×10^{-7} $\mu\text{C}/\text{ml}$. of air.¹⁰ Obviously, the SpA of the krypton-85 in the bulk flask must be recalculated at intervals, since, with each addition of distilled water to the flask at the time of withdrawal of krypton-85, the equilibrium condition will change slightly, resulting in a lower concentration of the radioisotope in the air above the fluid level within the flask.

Control Testing

After the formulation of the product has been accomplished, suitable aliquots are submitted for pyrogen and sterility testing, as outlined by the United States Pharmacopeia.¹¹ In addition, a radiochemical assay is performed on the product, and this is perhaps the most problematical aspect of the entire procedure. While the calibration of Curie amounts of krypton-85 with an electroscope poses no particular problem, the assay of much smaller amounts of activity, of the order of 50 microcuries, is entirely a different matter. Several methods have been utilized in an attempt to provide that degree of control commensurate with the hazard involved in the biological use of this product. The most recent method devised by the Radiation Safety Office of this institution seems to be the most adequate. Using a multi-channel analyzer^h and a fixed source to crystal distance, count rates per microcurie of the following gamma emitting isotopic standards were obtained: Co⁶⁰, Na²², Mn⁵⁴, Cs¹³⁷, Na²² (0.51 Mev. annihilation radiation), and I¹³¹ (0.364 Mev. photon). In each case, the count rate was determined at a discrete gamma photon energy. Then, by plotting count rate per microcurie *versus* gamma photon energy on semi-log paper, a straight line curve was obtained.

Finally, by setting the analyzer on the 0.54 Mev. photon peak of krypton-85, the count rate of the "unknown"—in this case, the radiopharmaceutical product—is determined, at the same source to crystal distance used in the standard determination. The number of microcuries of krypton-85 present in the product can then be determined from the standard curve, by observing the count rate per microcurie at this energy; again the correction factor for the percent occurrence of this emission must be applied. After the completion of control testing, the product is released for human use.

Summary

Some of the physical and radiochemical properties of the radionuclide krypton-85 are discussed, and a method for the pharmaceutical formulation and control testing of an intravenous dosage form of this radioactive foreign gas is presented.

ACKNOWLEDGMENT. The author is indebted to Dr. Howard L. Andrews, Radiation Safety Officer, and Mr. Joseph M. Brown, Jr., Chief Health Physicist, both at the National Institutes of Health, Bethesda, Maryland, for the development and performance of all calibration procedures mentioned in this manuscript, as well as for their professional advice concerning many aspects of this total product development.

^aAvailable from the Kimble Glass Co., Division of Owens-Illinois Glass Co., Toledo, Ohio.

^bAvailable from Glyco Products Co., Empire State Building, New York, N.Y.

^cSwinny Hypodermic Adapter (cat. #XX30 012 00) with HA porosity membrane filter, available from Millipore Filter Corp., Bedford, Mass.

^d"Pliapak," available from Abbott Laboratories, North Chicago, Ill.

^eBD 425, available from Becton, Dickinson and Co., Rutherford, N. J.

^fModel R4403 Gloved Box, Berkeley Type, available from Radioisotope Applications Co., Division of Scientific Service, Inc., Berkeley, Calif.

^gG36T6 Germicidal UV Lamp, available from the General Electric Co., Lamp Division, Cleveland, Ohio.

^hModel 20611-2²⁰ 256 Channel Analyzer, available from Radiation Counter Laboratories, Inc., Skokie, Ill.

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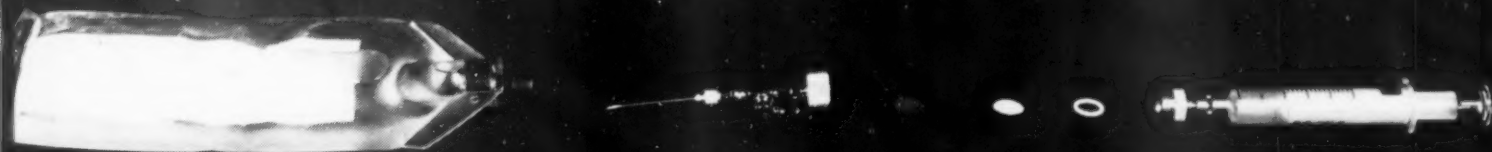
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Kr⁸⁵ Sterile Filtration-Mixing Assembly



THE CASE OF THE UBIQUITOUS THERMOMETER

by ELEANORE S. WRIGHT and RODERICK A. MUNDY

► THAT THE THERMOMETER IS UBIQUITOUS IN hospital use, there can be no doubt. That the oral thermometer, if improperly disinfected, can play a role in hospital cross-infection, can be accepted as axiomatic. Certainly if virulent streptococci and coagulase-positive, antibiotic-resistant staphylococci do inhabit the throat and nasopharynx, they can also be found on the oral thermometer. In the case of the ubiquitous thermometer, one is reminded of a Perry Mason "who dunit." It is as difficult to isolate the guilty staph or strep from the myriads of organisms found on the thermometer as it is for Perry Mason to identify the guilty party in the beginning of his case. However, as in a Perry Mason dénouement, the culprit, staphylococcus cross-infection, is uncovered. Unlike the carefully worked out plot of the "who dunit," the trail back in cross-infection to the poorly disinfected thermometer is difficult to trace. It can only be considered one of the many factors which may be held responsible.

A search of the literature indicated that no study, except a recent one by the authors,¹ had been made using naturally infected thermometers and disinfectants currently employed by hospitals. Work has been done on glass rods and thermometers artificially contaminated with cultures of microorganisms and microor-

ganisms suspended in serum, mucin, saliva and sputum.^{2,3,4,5} All of this work represents artificial conditions unlike those encountered when the thermometer is in actual use. The experiment designed by us and described in this report consists of tests conducted on oral thermometers shortly after their use by patients in a general hospital.

Classes of Disinfectants

Hospitals have long recognized the role that the thermometer may play as a possible source of cross-infection. Different hospitals recommend different disinfection procedures. Some hospitals disinfect the thermometers at the bedside, some send them to a central source for a carefully controlled disinfectant routine, and others assign a thermometer to a patient on his entry into the hospital to be used by him and him alone throughout his stay. All of these procedures presuppose that the disinfectant of choice is adequate for the purpose.

Adequate solution of this problem of disinfection requires a knowledge of disinfectants and their limitations. There are four classes of disinfectants commonly employed to disinfect thermometers: alcohol, phenolics, quaternary ammonium compounds and iodine or iodine complexes. Our tests include the evaluation of these compounds when used as specified by the manufacturers of the product. Parts of this study have been previously reported and are included in this report for completeness.¹

ELEANORE S. WRIGHT and RODERICK A. MUNDY are associated with the Research and Development Laboratories, Lehn & Fink Products Corporation, Bloomfield, New Jersey.

Procedure for Evaluating Effectiveness

Becton, Dickinson and Company supplied the oral thermometers used for the tests. Since the effectiveness of the various disinfectants was unknown when tests were begun, the thermometers were heat sterilized before each use. This was done so that the re-use of the thermometers could not cause any cross-infection. In order to heat sterilize the thermometers, the mercury was removed by breaking the upper tip, and the tip resealed by heating. After sterilizing, the thermometers were sent to the hospital and placed in the mouths of patients on surgical and medical wards. They were collected in sterile trays and returned to the laboratory. Each thermometer was immersed separately in a tube of the disinfectant solution and left for 15 minutes at 20° C. Each thermometer was rinsed in a separate tube of distilled water and then dropped into a tube of Difco Fluid Thioglycollate broth. In tests with quaternaries, addition of Tamol N to the broth eliminated the bacteriostatic effect of these compounds. All culture tubes were incubated for one week at 37° C. Samples of all tubes showing growth at the end of incubation were subjected to microscopic examination, using the gram stain. A few tubes were found to contain spore-bearing bacilli and these were omitted from the test results, as none of the disinfectants tested is sporicidal under the conditions of the test.

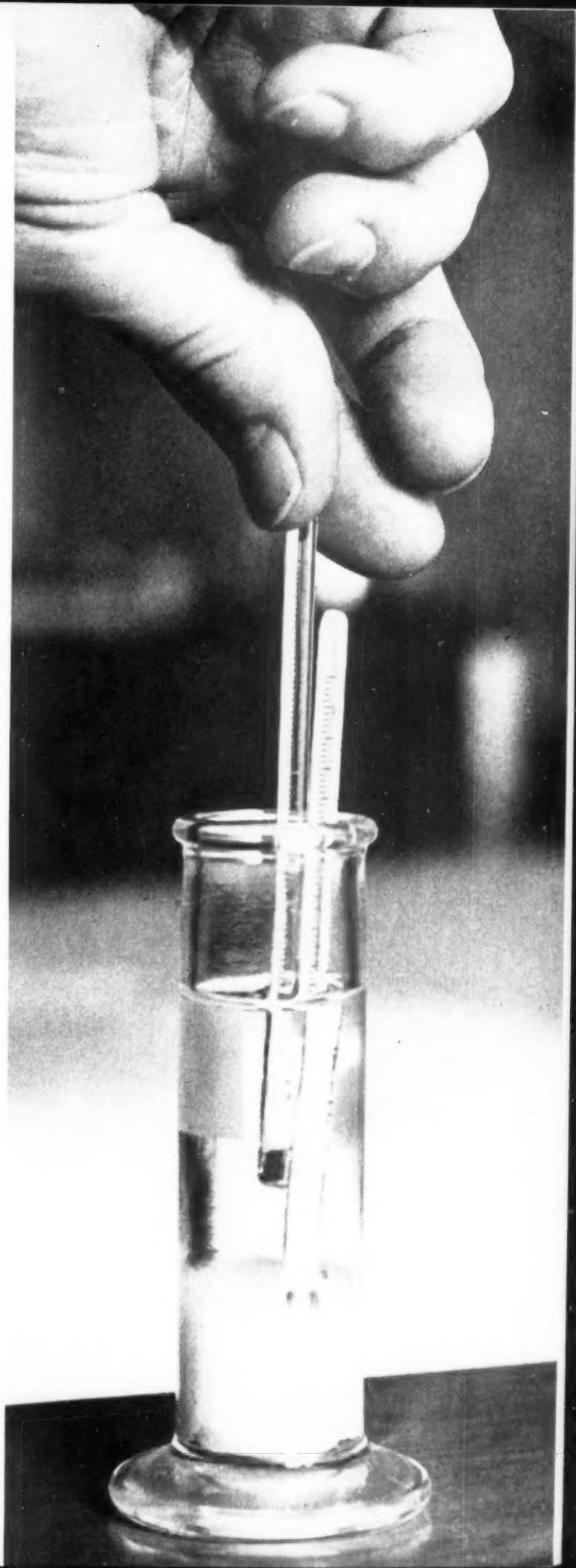
Two series of controls were tested. The first series was to discover the type of flora recovered from the thermometers. This was done by following the above procedure but exposing the used thermometers to sterile water in lieu of the disinfectant. The second series of controls was made to determine the number of positive cultures which might be encountered due to manipulation during the test procedure. In this series, sterile unused thermometers and sterile distilled water only were used. Any growth encountered in this series was due to air-borne contamination and was in no way connected with the use of the thermometer by the patient.

As previously stated, the disinfectants tested included those in general use in hospitals—alcohol, phenolics, quaternary ammonium compounds, and iodophors—and were tested in dilutions recommended by the manufacturers. All dilutions tested were aqueous solutions except in the case of benzalkonium chloride which was tested both in aqueous and alcoholic solutions as recommended by the manufacturer.

Results and Conclusions

A great many thermometers must be tested to evaluate a disinfectant when the thermometer is actually used by the patient since a great variety of microorganisms will be found.

In evaluating adequacy of the disinfectant solutions tested, two criteria were used:



1. The number of tubes showing growth. The table indicated that 2 percent of the sterile thermometers tested showed growth on being cultured. Since this accidental air-borne contamination might vary from test to test, it was decided that solutions which disinfected 96-100 percent of the thermometers could be considered satisfactory if the microorganisms found in the cultures were those which might be considered possible air-borne contaminants.

2. The presence of streptococci in the cultures. The presence of streptococci found in any culture indicated that the disinfectant was not reliable since the source of the streptococcus must be the mouth of the patient who used the thermometer. Thus the threat of cross-infection had not been removed.

With these two criteria as standards only 70 percent ethyl alcohol, 3 percent of synthetic phenolic No. 1, 2 percent of synthetic phenolic No. 2 and 0.1 percent benzalkonium chloride tincture may be relied upon to produce adequate disinfection of oral thermometers. Ethyl alcohol 50 percent, the iodophor 0.5 percent (75 ppm I₂) or 2 percent (300 ppm I₂) and aqueous benzalkonium chloride 0.1 percent, were not reliable disinfectants. Although 2½ percent of synthetic phenolic No. 3 disinfected 98 percent of thermometers, it was considered unreliable since streptococci survived on the remaining 2 percent.

And so—if the wrong disinfectant is selected for use, we can point to the improperly sterilized thermometer as a possible culprit in cross-infection. We are not as fortunate as Perry Mason, who always turns out to be pointing unerringly to the guilty party, but we have sufficient evidence to inculcate the thermometer and embarrass the defense, as Mr. Mason invariably does.

ACKNOWLEDGMENTS. The authors wish to thank Becton, Dickinson and Company for supplying the thermometers for these tests. We also thank Miss Mary C. Dineen, R.N., Director of Nursing Service and Miss Lucie R. Ennis, R.N., Assistant Director of Nursing Service of Mountainside Hospital, Montclair, New Jersey, for using the thermometers in the hospital wards.

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Table Of Results

DISINFECTANT	CONCENTRATION TESTED	NO. OF THERMOMETERS TESTED	NO. OF THERMOMETERS POSITIVE	TYPE OF MICROORGANISM FOUND					PERCENT NEGATIVE
				STREPTOCOCCI	OTHER GRAM-POSITIVE COCCI	GRAM-POSITIVE BACILLI	GRAM-NEGATIVE BACILLI	YEAST	
Ethyl Alcohol	50%	50	7	1	1	1	5		86
	70%	100	3		1	1	1		97
Synthetic Phenolic #1, p.c. 5	3%	100	3		1	1	1		97
Synthetic Phenolic #2, p.c. 10	2%	100	1		1				99
Synthetic Phenolic #3, p.c. 10	2.5%	100	2	2					98
Iodophor	0.5% (75 ppm I ₂)	50	18	12	3	2	2	1	64
Iodophor	2% (300 ppm I ₂)	100	14	7	6	1	1		86
Benzalkonium Chloride, aqueous	0.1%	50	9	2	3	2	1	2	82
Benzalkonium Chloride, Tincture	0.1% in 50% Alcohol	100	4				3	1	96
Water Control		100	100	80	75	2	3		0
Transfer of Sterile Thermometers		100	2		1		1		98

p.c. = phenol coefficient

Synthetic phenolic #1 - Osyl - Lehn & Fink Products Corp., Bloomfield, N.J.

Synthetic phenolic #2 - Amphyl - Lehn & Fink Products Corp., Bloomfield, N.J.

THE HOSPITAL PHARMACIST AND THE PHARMACY PROFESSION

by LLOYD M. PARKS

► IT IS A PRIVILEGE FOR ME TO HAVE A PART IN THIS closing exercise of the Institute on Hospital Pharmacy although, after the past five days of intensive classes, discussions and demonstrations, I am somewhat doubtful as to what a dean may be able to contribute. But as one who has an active interest in pharmaceutical education and who considers hospital pharmacy one of the most important areas of activity in our profession, I am happy to have the opportunity to talk with you for a few minutes today.

Emergence of Hospital Pharmacy

One of the most enlightening and encouraging developments in our profession during the past few decades has been the rapid development and improvement of the place of hospital pharmacy. Within a short period of time the hospital pharmacist has elevated himself from a position that was regarded as a "second-rate specialty" to a position of respect and leadership that commands the admiration and, yes, the envy of everyone in pharmacy. Hospital pharmacy has become a mature professional specialty and in so doing it has made significant contributions and stimulated creative thought and effort, not only in its own specialty but in all of pharmacy.

As pointed out by The Pharmaceutical Survey more than 10 years ago, the hospital pharmacist holds a

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Presented at the Institute on Hospital Pharmacy, Ohio State University, Columbus, Ohio, June 24, 1960.

strategic position in pharmaceutical practice because of the professional environment in which he practices and the opportunity he has to render real assistance and service in the care of the sick. You have been keenly aware of your opportunities and your responsibilities and, as a group, have committed yourselves well.

Laudable Characteristics

As I look at your accomplishments of the past 20 years and observe the activities of my friends in your ranks, I am struck by a number of outstanding characteristics that seem to set you apart as a group in pharmacy. I would like to mention some of them.

Perhaps most impressive and most gratifying to me as a teacher is the self-reliance which you have demonstrated in your professional work. You have proved our contentions in pharmaceutical education that the pharmacist *does* receive a well rounded professional and technical training in his academic program; that he *is* able to do an outstanding professional job; and that, by the application of his native ability and with a little effort, he can build solidly on his academic foundation over the years and grow and develop in professional stature.

Closely related to this characteristic is the awareness you have shown of the value of and necessity for your professional self-improvement. This is evidenced by the frequent and well supported hospital pharmacy institutes like the one which has been completed here today. With the rapid pace of modern drug development and the changes in therapy and patient care, continuing

professional education is the only salvation of the pharmacist who wants to keep up to date in his practice. It has been particularly enlightening to observe that hospital pharmacists have not waited for some other group to solve this professional problem for them but have tackled it themselves with vigor and with gratifying results.

One of the marks of a profession is that it is self-regulating and in this characteristic also hospital pharmacists have shown outstanding achievement. Through the formation and support of your progressive national organization, the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS; through your JOURNAL; through your strong and active local chapters; by your successful efforts to initiate, implement and strengthen minimum standards for your professional practice; by your success in making the pharmacy a significant department in the accreditation of hospitals; by your self-imposed and self-controlled internship programs—all of these are evidence not only of your appreciation for self-regulation but also of your willingness and ability to tackle your professional problems successfully.

In all of these activities you have also shown great appreciation for the value of cooperation—through professional organization, not as a splinter group in your own society, but as a professional specialty affiliate of the American Pharmaceutical Association; through your desire to provide total pharmacy service in the operation of the hospital; and through your institutes such as this one for the purpose of mutual self-help and benefit.

Growing Significance of Hospital Pharmacy

Yes, hospital pharmacy has come of age. No other group or specialty in pharmacy has shown as much sincere devotion to duty, to professional achievement, and to self-improvement in a comparable period as have the hospital pharmacists in the last two decades. And with it all there is one other characteristic which sets you apart and which serves as an inspiration to those who observe you at work as well as at play. I refer to the obvious satisfaction and the real enjoyment which you get from your work and the fun you seem to have in your professional associations with one another. Your *esprit de corps*—your willingness to tackle your problems instead of blaming someone else for them; your accenting the positive and ignoring the negative—these laudable qualities should serve as good examples to other groups in pharmacy.

When one considers that an estimated 30 percent of the total ethical drugs in the United States today are distributed through hospitals the significance of the hospital pharmacist becomes readily apparent. A study of the data on the number of hospitals that are without the services of a pharmacist indicates that a significant portion of those drugs is being dispensed by someone

other than a pharmacist. And the future prospects for your field are even more sobering to contemplate. It has been estimated that there will be a need for between 400 and 500 new hospital pharmacists each year through 1970. There is a definite trend among physicians to concentrate their group practice in or near the hospital where they and their patients may have the benefit of the hospital's facilities and services, including those of the hospital pharmacy. We may expect a continuing increase in the number of hospitals in this country to keep up with the increasing population.

All of these factors point toward a bright future for hospital pharmacy and emphasize the strategic position which the hospital pharmacist will continue to occupy in the future. They also emphasize the real need there will be for the hospital pharmacist to maintain a perpetual inventory of his capabilities and worthiness for the increased responsibilities and the power of influence that will be in his hands—increased responsibility and opportunity not only for professional practice but also for control of the future shape and destiny of the profession of pharmacy itself. By your increasing numbers, and by your increasingly strategic position of importance in the health care field you, as hospital pharmacists, may assume a position of potential power and influence in the future of our profession that is analogous to the rapidly developing position of the senior citizens in our population—and I do not refer to your declining physical or mental faculties! Whether we have good *hospital* pharmacy or otherwise is up to the hospital pharmacists today. Tomorrow it may well be that whether we have good *pharmacy* or otherwise will also be up to the hospital pharmacists.

The changing times bring changes in the practice of pharmacy as we have known it and changes in the very nature and control of pharmacy are indicated for the future. Pharmacy is facing some important problems, not only on the outside but also within its own ranks. Some of these problems can lead to dissention and disastrous splintering in its ranks if they are not approached with an attempt to understand the other person's point of view. There is a great need, in this area of intraprofessional relations, for closer cooperation among all groups in pharmacy on their mutual problems.

Hospital and Retail Relationships

As an interested bystander, I have been concerned about the trend that appears for the hospital pharmacist and the retail pharmacist to grow apart from each other in their professional activities. As the two groups in pharmacy that are closest to the public eye, retail pharmacy and hospital pharmacy must be united. Even at best their problems in public relations are difficult; without union those problems defy solution.

Hospital pharmacists as a group are more militant, more aggressive and more organization minded among their own kind than are retail pharmacists. Their interests are more strictly professional than commercial. They are in a somewhat more protected employee position in the hospital which services the community. They have had a tendency to meet and solve to their own satisfaction some of their problems without too much thought in some cases to the effect of the solutions on the other pharmacists in their communities. This has caused misunderstandings and even injured professional feelings in some cases.

How many, or what proportion of, hospital pharmacists are members of their local and state pharmaceutical associations? How many attend the meetings and support the programs of those same groups? How many chapters of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS have held regular joint meetings with their local pharmaceutical associations to discuss problems of mutual concern? I do not know the answers to these questions but I suspect that the numbers could be considerably higher than they actually are.

Intraprofessional organization and communication in pharmacy in the horizontal plane is just as important as it is in the vertical plane. Hospital pharmacists do not alone represent pharmacy to the public any more than do their colleagues in retail pharmacy; in these days of modern medical care both groups represent the profession in their contacts with the public. Both groups will continue to exist and peaceful co-existence in this case will be far better for pharmacy and for the public than will be a perpetual cold war.

Need for Understanding and Cooperation

Hospital pharmacists and retail pharmacists need to understand and cooperate with each other. Let me cite just three examples why this is necessary:

1. For the support which retail pharmacists can furnish in legislative, professional and political matters. The retail pharmacist in most cases is a respected member of his community, owns his own business, meets a payroll, pays many kinds of taxes, and in many other ways supports the economy of his community. He willingly places the strength of his personal position in the community as well as the force of his local and state pharmaceutical associations behind legislative and professional matters which are of benefit to hospital pharmacy. As one example, the retail pharmacists in Ohio, as individuals and in their organizations, were quick to rally in effective opposition to the hospital pharmacy technician scare that occurred in Cleveland a little more than a year ago.

2. For the enlightenment which hospital pharmacists can furnish on the apparent and much talked about but little understood disparities between retail and hospital pharmacies on problems of prescription prices, outpa-

tient prescription policies, generic name dispensing, the formulary system, and other similar problems. The hospital pharmacist is a respected member of the hospital staff who has the understanding, the confidence and cooperation of the hospital administration. He can explain the position of the hospital on some of these problems and can also serve as the liaison between the community pharmacist and the hospital administration in the solutions to some of them. I do not profess to know the answers to these problems, nor am I taking one side against the other. But I am convinced, from the number and the magnitude of the rumblings I hear, that these problems do demand discussion and some solution in the interest of good public relations for pharmacy. I suspect that some of them would cease to be problems if understanding were reached through open minded discussions.

3. For advice and guidance on the ways and means to provide pharmacy service to those hospitals which have the benefit of neither a full-time nor part-time pharmacist. Here is a real problem and challenge of mutual concern, the solution to which would be a great service to the public health and welfare as well as a benefit to pharmacy. A recent survey of the American Hospital Association shows that almost 58 percent of the voluntary short term general hospitals lack the services of a pharmacist, either full-time or part-time. The majority of these are among the smaller hospitals in communities where the local pharmacist could be expected to assist in furnishing service on a part-time basis. I am sure that many of them would accept this as a part of their professional responsibility to their community if it were pointed out to them. But many retail pharmacists are unfamiliar with the hospital's routine and its pharmaceutical needs. Here is an opportunity for the hospital pharmacist to cooperate in giving his retail colleague the benefit of his experience and advice.

This subject of how to assist the retail pharmacist in planning and providing pharmacy service for his community hospital might well be made a part of the program of one of your hospital pharmacy institutes.

None of the problems that confront pharmacy is solely that of any one group in the profession. Most of them are of mutual concern for all groups in pharmacy and for the public. With the show that has been going on recently in Washington under guise of a Senate investigation, the public image of pharmacy is in danger of becoming clouded. The hospital pharmacist shares with the community pharmacist the opportunity and the responsibility to insure that the public image of pharmacy is a good one.

It has been a pleasure to have you on our campus this week. May I wish you a safe journey on your return to your homes and continued success and happiness in your future activities in hospital pharmacy.

a comparison of methods for CLEANING CATHETERS using an IODINE - 131 contaminated soil

by HENRY A. PALMER and DONALD M. SKAUEEN

► THE STRUCTURE OF A CATHETER MAKES CLEANING a problem if contaminants are allowed to "cake" on the catheter's inner wall. Because of the catheter's narrow lumen, the inner wall is inaccessible to any conventional means of scrubbing, as well as to inspection. The problem is eased if certain preventive measures are taken immediately after use of a catheter. Among these measures is rinsing thoroughly or merely placing the used catheter in a detergent solution until it can be cleaned. The use of disposable catheters eliminates the problem entirely.

It was the purpose of this study to compare three cleaning methods:

1. Hand washing
2. Washing in a home laundry-type automatic washer
3. Ultrasonic washing

Experimental

Application of Contaminant. Nine varieties of catheters** were used in the study representing several different sizes on the French scale. Thirty each of seven varieties were contaminated with 1 ml. of citrated bovine blood containing I-131. The labeled blood was allowed to come in contact with the entire inner surface of the catheter by holding the end in one hand and tip in the other and alternately raising and lowering each five times. They were then exposed to an infrared lamp for one hour and dried at room temperature for 24 hours under an exhaust hood. Ten each of the remaining two varieties (Robinson and Nelaton) were likewise contaminated, except that they were

exposed to the infrared lamp for an eight-hour period before the 24 hour room temperature drying time under the exhaust hood.

Washing Procedures. At the conclusion of the drying period, 10 were washed in a General Electric*** top loading automatic washer with the use of 50 Gm. of Alconox****. Ten were washed by soaking in a basin containing ½ gallon of 0.1 percent Alconox solution at 50° C. for one-half hour. During this period, they were flexed once every 10 minutes to aid in loosening dried blood from the walls. The wash water was drained off and fresh rinse water (50° C.) was added. The soaking period in rinse water was one-half hour with three flexings. The remaining ten catheters were placed in one and one-half gallons of hot (50° C) 0.1 percent Alconox solution contained in a Branson, T-52 transducer tank connected to a Model AP25B Sonogen Generator.***** Insonation at 39.1 KC was carried out for 5 minutes with the catheters totally submerged and 5 additional minutes free floating. Rinsing was carried out by first allowing the catheters to drain after removing from the tank. Detergent solution was drained from the tank and clean hot (50° C.) tap water added. The catheters were then exposed to an ultrasonic rinse for 5 minutes.

After washing by each method, the catheters were allowed to drain free of excess water and dried in an exhaust hood for 24 hours.

Measurement of Residual Radioactivity. The catheters were tested for residual radioactivity by carefully slitting each lengthwise and attaching to a special sample holder for introduction into a manual sample changer. This permitted more accurate assays due to better sample geometry. Six sites, including tip and end, were assayed on each catheter.

Results of the various experiments are recorded in Tables 1, 2 and 3.

HENRY A. PALMER is a Graduate Assistant and DONALD M. SKAUEEN, Ph.D., is Professor of Pharmacy, both at University of Connecticut, Storrs, Connecticut.

*From the Research Laboratories of the University of Connecticut, School of Pharmacy, Storrs, Connecticut.

**Generously supplied by the Davol Rubber Company, Providence, Rhode Island and the B. F. Goodrich Rubber Company, Cleveland, Ohio.

***Model Number 1AW5B8, General Electric Company, Bridgeport, Connecticut.

****Alconox Company, New York, New York.

*****Branson Ultrasonic Corporation, Stamford, Connecticut.

Discussion

Table 1 is a list of only those catheters which were designated "totally clean." To achieve this designation, it was necessary that the radioactive count at any of the six sites be no more than 10 percent above background.

Table 2 shows the relationship between catheter size and "totally clean" ratings. There appears to be a line of demarcation limiting the maximum efficiency of hand washing and use of automatic washer to specific sizes; 14 and above in the former methods, 12 and below in the latter.

Since the most physically complex portion of a catheter is usually its tip, this area may represent a difficult area to clean. Table 3 is a listing of the number of "clean" tips in each group. Once again, the automatic washer gave best results.

In two earlier reports^{1,2} it was shown that ultrasonic cleaning techniques were superior to conventional cleaning methods for glass hypodermic syringes. The results noted in the tables above prove how perilous it is to predict the outcome from previous experience.

The unfavorable showing of ultrasonic washing in this case can largely be attributed to the nature of the material from which the catheters are made. The soft rubber walls "cushion" the action of the ultrasonic waves and render them inefficient.

Summary and Conclusions

A comparison of three cleaning methods for catheters has been described. The cleaning methods involved hand washing, use of a home laundry-type automatic washer, and ultrasonic washing. The evaluation of cleaning efficiency involved the use of Iodine-131 labeled blood as the added contaminant. Nine different type catheters were used, representing several different sizes on the French scale.

The following conclusions were reached:

1. The best cleaning results were obtained using the home laundry-type automatic washer.
2. The hand washing method closely approaches the cleaning efficiency of the automatic washer.
3. Ultrasonic washing for catheters is not feasible using the technique herein described.
4. The fact that the best cleaning method employed in this study completely cleaned only one out of two catheters appears to be a sound basis for the use of disposable catheters.

References

1. Beal, H. M. and Skauen, D. M.: Hypodermic Syringes and High Frequency Sound, *Am. J. Hosp. Pharm.* 15:222 (Mar.) 1958.
2. Beal, H. M. and Skauen, D. M.: A Comparison of Hand Washing, Pulse Jet Washing and Ultrasonic Washing of Syringes Using Radioactive Iodine-131 as a Tracer, *Am. J. Hosp. Pharm.* 16:292 (June) 1959.

Table 1. Number of "Totally Clean" Catheters

CATHETER	HAND WASHING	AUTOMATIC WASHER	ULTRASONIC WASHER
Bardex	4	1	0
Coude	8	6	0
DeLee Tracheal	2	9	0
Malecot	4	9	5
Nasal Oxygen	8	5	0
Pezzer	7	5	4
Whistle Tip	4	5	2
Totals*	37	40	11
Percentage of "Clean" Catheters	52.8%	57.1%	15.7%
Nelaton	4	1	1
Robinson	0	6	0
Totals** (Nelaton and Robinson)	4	7	1
Percentage of "Clean" Catheters	20.0%	35.0%	5.0%
Totals*** (All)	41	47	12
Percentage of "Clean" Catheters	45.5%	52.2%	13.3%

*Of a possible 70

**Of a possible 20

***Of a possible 90

Table 2. Relation of Catheter Size to the Number "Totally Cleaned"

SIZE (FRENCH SCALE)	NUMBER OF CATHETERS	HAND WASHING	AUTOMATIC WASHER	ULTRASONIC WASHER
10	20	6	14	2
12	30	8	16	6
14	10	8	5	0
16	10	8	6	0
18	20	11	6	4

Table 3. Number of "Clean" Tips

CATHETER	HAND WASHING	ULTRASONIC WASHER	AUTOMATIC WASHER
Bardex	6	6	0
Coude	8	9	0
DeLee Tracheal	7	10	5
Malecot	4	10	10
Nasal Oxygen	6	7	0
Pezzer	10	8	10
Whistle Tip	5	7	4
Totals*	46	57	29
Nelaton	4	1	3
Robinson	1	7	2
Totals** (Nelaton and Robinson)	5	8	5
Totals*** (All)	51	65	34

*Of a possible 70

**Of a possible 20

***Of a possible 90

PREPARATION OF COULTER COUNTER DILUTING FLUID

by G. L. FORBES, JR. and TERRY B. NICHOLS

► THE HISTORICAL ASPECT OF COUNTING BLOOD CELLS dates back to work by K. Vierordt in 1851. It is interesting to note that he smeared a drop of blood upon a glass slide and used a gummy diluting and preserving fluid for nine counts. He obtained an accurate average of 5,174,000 cells per cu.mm. With this crude experiment as a beginning, blood counting techniques have steadily improved and have steadily advanced to

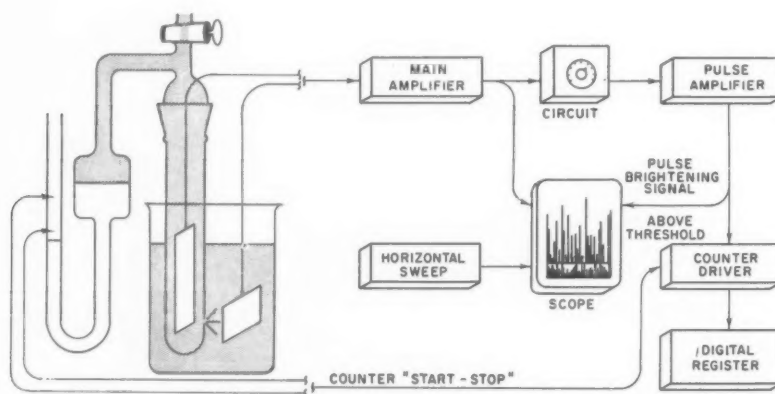
G. L. FORBES, JR., M.D., is Director of Laboratories and TERRY B. NICHOLS, B.Sc. is Chief, Pharmacy Service, at Georgia Baptist Hospital, Atlanta, Georgia.

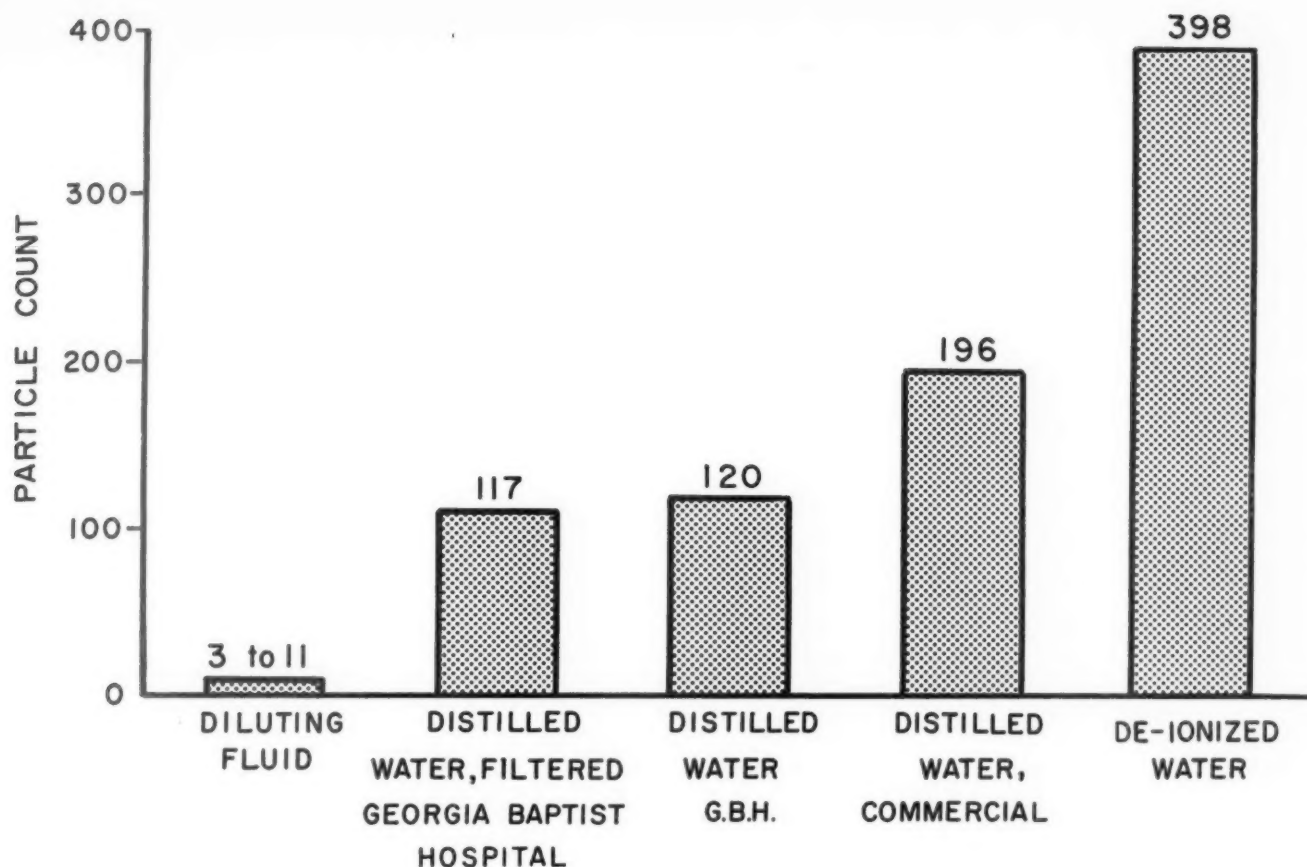
Presented at the Annual Meeting of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, Washington, D. C., August 1960.

a highly scientific level.¹ Today, these procedures represent approximately 50 percent of the hospital laboratory procedures performed.

There are many types of cell counting chambers and blood pipettes which give fairly accurate results. As you will readily agree, the human count at the end of a hard day may vary greatly. True, a single determination on an electronic counter is no more accurate than using a pipette; but, an electronic counter is a great time-saving device. In addition, the counter removes the element of human drudgery which potentially affects the physician's overall faith in laboratory reports. The use of an electronic counter, such as the type developed by Dr. Coulter of Coulter Electronics

Flow Chart showing the general arrangements of components of the Coulter Counter





Inc., Chicago, Ill., has been demonstrated as an efficient, economical, and practical means of providing around-the-clock laboratory reporting of blood counts. Our counter has been repaired only twice in the past year, and these periods were of short duration and they did not materially affect the production of the department.

Principle of Electronic Counters

Electronic counters are based upon the principle that cells are poor conductors of an electrical current as compared to a saline solution. The counter determines the number and size of particles suspended in an electrically conductive liquid. The Coulter counter records the number of suspended particles in a solution which conducts an electrical current. An aspirator pump draws the suspension through a minute aperture into the counting chamber where an electric current is conducted between platinum electrodes. As the cell passes through the aperture, an equal volume of conductive fluid is displaced, which modulates the electric current. This modulation forms electrical pulses which are amplified and counted. An oscilloscope is attached to the counter as a performance check to show the existence of debris and information on relative cell size as well as relative cell size distribution in the counting chamber.

Preparation of Diluting Fluid

Originally it was felt by the team setting the counter up that deionized water would be satisfactory to prepare the diluting fluid, but as we can determine from the chart the particle count was extremely high. We then counted the distilled water filtered through a Sela microporous porcelain filter candle with a porosity designation of 10. This filter has a maximum pore size of 4.4 microns radius and requires a bubbling pressure of 5 pounds per square inch. This particle count was 117 which was still unsatisfactory.

The next step was to try a solution using the filter candle with a 015 porosity designation with a maximum pore size of 1.4 microns radius and requiring a bubbling pressure of 15 pounds per square inch to deliver. The count made using this filter was extremely satisfactory. Subsequent counts have ranged from 30 particles per count down to 3 particles per count for all batches of fluid manufactured with the 015 porosity filter.

Our experience has shown that the diluting fluid for the counter must never have a background count of more than 3 percent foreign materials of the average count of cells. Since the machine counts all particles whether they are blood cells or trash, you can readily see it is beneficial to produce a fluid that has a background count that is almost nil. As you will

notice, our diluting fluid for the counter generally has a background count of 3 to 11. If saline were used that had not been specially filtered, the background count would run approximately 115 to 125. All counts are taken at the threshold level for counting white cells. As you see in the flow diagram, the threshold adjustment controls the range of size of particles that will be counted. This can be changed by inducing more current into the circuit.

Several hospitals use unfiltered saline as a diluting fluid and deduct the background count from each reading. This is acceptable; however, this method of deducting a background count is likely to have a greater variance than a standard filtered solution prepared with a filter of the 015 porosity type.

Incidentally, sterilization of most pharmaceutical preparations is accomplished under aseptic conditions when this filter is used. The filter is cleaned by ignition after each use to prevent clogging. After using, the filter element is completely dried. The filter is then placed in a muffle furnace at room temperature and the temperature is increased at the rate of 300° per hour until the temperature of 1250° C is reached and

held for one hour. The muffle furnace is then cut off and allowed to cool to room temperature before the filter is removed.

The formula for the diluting fluid is:

Versene (Disodium Ethylenediamine	
Tetraacetate)	6.4 Grams
Sodium Chloride C. P.	680.0 Grams
Distilled Water, to make	80.0 Liters

The diluting fluid is prepared in a stainless steel mixing tank designed to mix as well as to fill intravenous fluid containers. This machine is manufactured by American Sterilizer Company, Erie, Pa., and is capable of delivering the pressure needed to force the solution through the filter. The filtered fluid flows directly into a 20 liter polyethylene carboy. A total of 80 liters is prepared at a time. This amount will last our hospital for a period of approximately five weeks.

Advantages

A commercial saline suitable for use with the electronic counter is available at a cost of approximately 85 cents per liter. In addition to the cost, there are several other disadvantages of commercial saline. The main objection is that the commercial fluid is presently available in liter units only, whereas the fluid manufactured by the pharmacy is prepared in 20 liter carboys. Once the polyethylene carboy is hooked up in the laboratory it does not have to be changed until the carboy is empty. If one liter commercial bottles were used there would be many seals to tear as well as tops to remove from the containers. Not only does this waste man-hours but it also creates a storage and trash removal problem. The hospital manufactured fluid also contains Versene. The purpose of this chemical is to prevent any formation of fibrin particles from the plasma in the blood dilution. Should you desire to add Versene to a commercial solution, it would necessitate addition to each individual liter.

The cost of the pharmacy prepared fluid is negligible in our situation. Labor is the highest cost, but it is a small item. The chemicals are inexpensive. Since the solution room is used for preparing intravenous fluids, external fluids and distilled water, it can readily be seen that only a small portion of the overhead can be charged to the preparation of diluting fluid for one hour per month.

The successful operation of this electronic counter demonstrates the proficiency and economy brought about by close interdepartmental relationships. In the overall operation of the hospital, all of us knows that this is very important. Only when we mutually understand problems and standards of other departments can we apply our knowledge and skills to achieve higher standards of patient care in our efforts to lighten the load of suffering humanity.

1. Kracke, Roy: Textbook of Clinical Pathology, 1938 Edition, Page 90.

Filtering Unit of AMSCO Premix tank showing utilization of Sela filter candle



the release of
ANTISEPTICS & ANTIBIOTICS
from
LANTROL-
containing ointment bases

by CHARLES H. NESBIT, ROLAND F. HARDING and
MURIEL C. VINCENT

A series of ointments based on Hydrophilic Petrolatum and Hydrophilic Ointment were made, incorporating various concentrations of Lantrol, antiseptics and antibiotics. The bacterial inhibition of these ointments was tested with agar plates seeded with cultures of Staphylococcus aureus. Bacterial inhibition was particularly evident with hexachlorophene and oxytetracycline

► OINTMENTS ARE SEMISOLID PREPARATIONS of proper consistency intended for application to the skin by inunction. The bases employed as vehicles for ointments are commonly prepared from fats, animal oils, vegetable oils and waxes. Formerly it was believed

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® Malmstrom Chemical Corp., Newark, New Jersey.

We gratefully acknowledge the generous supply of Lantrol furnished by the Malmstrom Chemical Corporation.

ointment bases should be composed of petrolatum or a fatty base in order to effect greater penetration. In recent years, however, it has become apparent that there are many objections to this type of ointment base.

Wool fat or lanolin, which will absorb water, still finds an important role in the preparation of a great number of pharmaceutical and cosmetic preparations to be applied to the skin.

Recently many derivatives of lanolin have been introduced. One of these is Lantrol®, a liquid lanolin alcohol, which is produced by a patented fractional solvent crystallization process accomplished by horizontal separation of the higher esters from the oil soluble liquid esters.¹

Lantrol is reported to possess all the emollient value of lanolin in addition to other attributes. Its fluidity at room temperature permits it to be spread more readily and evenly. Particular advantages of Lantrol are its increased solubility in mineral oil and its solubilizing properties for many lipids, cholesterol and certain water immiscible liquids, such as castor oil.

The release of medicaments from various ointment bases is an important consideration in the compounding of any ointment. The complexity of the problem of selecting a base suitable for the particular affliction being treated and the medicament being employed presents the problem for the basis of this paper.

Experimental

In the series of experiments which were conducted, two basic ointments, Hydrophilic Petrolatum U.S.P. and Hydrophilic Ointment U.S.P. were used. Various percentages of Lantrol were formulated into each base to determine the effect of Lantrol on the release of the antiseptic and antibiotic from the base.

In previous experimental work² several modifications of the basic Hydrophilic Petrolatum U.S.P. formula with the addition of Lantrol provided maximum absorption of water. Therefore, these same formula modifications were used to determine the effect on the release of the medicament.

In the experimental work six ointment bases were prepared using Hydrophilic Petrolatum U.S.P. and modifications as follows:

Table 1. Series of Ointment Bases Employed

OINTMENT	INGREDIENTS, PERCENT CONCENTRATION				
	WHITE PETROLATUM	WHITE WAX	STEARYL ALCOHOL	CHOLESTEROL	LANTROL
Series #1	86	8	3	3	0
Series #2	89	8	0	0	3
Series #3	83	8	3	3	3
Series #4	86	8	0	3	3
Series #5	91	0	0	3	6
Series #6	89	0	3	0	8

To the series of ointment bases in Table I the following antiseptics were added:

- Hexachlorophene 0.01%, 0.1%, 0.15%, 0.2%
- Hexachlorophene with 0.1% EDTA 0.01%, 0.1%, 0.15%, 0.2%
- Merbromin 1.0%, 2.0%
- Benzalkonium chloride 1:1000, 1:5000
- Phenol 1.0%, 2.0%
- Hexitidine 0.5%, 1.0%

The following antibiotics were also added to the ointment bases in Table I:

- Novobiocin 1.0%, 2.0%
- Chloramphenicol 0.25%, 0.5%, 1.0%, 2.0%
- Penicillin 1000 units/Gm., 1500 units/Gm., 2000 units/Gm., 2500 units/Gm., 3000 units/Gm.
- Tetracycline 1.0%, 2.0%, 3.0%
- Oxytetracycline 0.5%, 1.0%, 2.0%, 3.0%
- Erythromycin 1.0%, 2.0%
- Bacitracin 500 units/Gm., 1500 units/Gm.

The next group of ointments was prepared using Hydrophilic Ointment U.S.P. as the base as follows:

- Series #7 Hydrophilic Ointment U.S.P. (containing white petrolatum stearyl alcohol, propylene glycol, sodium lauryl sulfate and purified water)
- Series #8 Hydrophilic Ointment U.S.P. plus Lantrol 2.0%
- Series #9 Hydrophilic Ointment U.S.P. plus Lantrol 5.0%
- Series #10 Hydrophilic Ointment U.S.P. plus Lantrol 10.0%

The same percentage strengths of antiseptics and antibiotics were formulated into the Hydrophilic Ointment series of bases as were used in the Hydrophilic Petrolatum series mentioned in Table 1.

Determination of Drug Release

A modification of the agar plate method was used. This test indicates inhibitory properties and is used for substances remaining in contact with the body in the absence of serous fluids. Ointments, dusting powders, creams, plasters, pads, adhesive tape, catgut and suppositories are a few of the substances that be tested in this manner. The test organism ordinarily used is *Staphylococcus aureus*. The agar was the same composition as that used for carrying stock cultures of the test organism.

The agar was autoclaved and cooled to 42° - 45° C. To this agar solution, 0.1 ml. of a 24-hour broth culture of *Staphylococcus aureus* was added. Five to 10 ml. of the inoculated agar was then poured into each sterile petri dish and allowed to harden.

Two-ml. disposable sterile syringes were filled with the previously prepared ointments. One-tenth ml. of the ointment was then placed in intimate contact with the surface of the agar in the petri dish. The agar plates were allowed to incubate at 37° C. and were examined at 24 and 48 hour intervals for evidence of bacterial inhibition.

A zone of clear agar will be noted around the ointment if the preparation is antiseptic or inhibitory. The width of the zone will indicate the diffusibility of the inhibitory (antiseptic or antibiotic) agent. If there is no inhibition, growth of the test organism will be observed adjacent to and even under the test ointment. In these experiments the radius of the zone of inhibition was measured in centimeters. The results obtained are given in Figures 1 through 5.

Results

Phenol, hexitidine, bacitracin and chloramphenicol, used in therapeutic concentrations equivalent to those commonly found in commercial ointments, gave no significant inhibition to *Staphylococcus aureus* in any of the previously mentioned ointment bases.

Hexachlorophene, Figure 1, produced consistently larger zones of inhibition in hydrophilic petrolatum bases than in hydrophilic ointment bases. The addition of 0.1 percent EDTA to hexachlorophene produced no significant advantage.

Merbromin, Figure 2, produced considerably larger zones of inhibition in hydrophilic ointment bases than in hydrophilic petrolatum bases.

Benzalkonium chloride produced no inhibition when hydrophilic petrolatum bases were used but, in the same concentrations, constant small zones of inhibition (0.3 cm.) were noted with hydrophilic ointment bases.

Novobiocin, Figure 3, and oxytetracycline, Figure 4, showed few marked differences in zones of inhibition with either series of ointment bases.

Penicillin produced very little inhibition in hydrophilic ointment bases but considerably more inhibition (2-3 cm.) in hydrophilic petrolatum bases.

Erythromycin, Figure 5, produced slightly greater inhibition in hydrophilic ointment bases than in hydrophilic petrolatum bases.

Tetracycline produced no inhibition in hydrophilic petrolatum bases but had a marked constant inhibition (1½-2 cm.) when used in hydrophilic ointment bases.

Summary

One must bear in mind the complexity of the problem of selecting an ointment base for a certain medication. The addition of Lantrol in various percentages to the two U.S.P. ointment bases has produced some influence in the release of the medicament from the base.

With those combinations exhibiting inhibition of bacterial growth, larger amounts of Lantrol usually resulted in greater decrease of bacterial growth, thus indicating enhanced release of antibiotics and antiseptics from the ointment base. The results, however, do not prove conclusively that Lantrol will enhance the release of all antibiotics and antiseptics from ointment bases.

The addition of Lantrol to the ointment base provided a smoother base and enhanced the hydrophilic properties of the base. It created a vehicle of pharmaceutical elegance. Lantrol greatly reduced the tackiness usually produced when lanolin is used in creams and ointments.

Due to the skin conditioning effect of Lantrol, these vehicles can give better absorption of antibiotics, antiseptics and other medicaments when applied topically.

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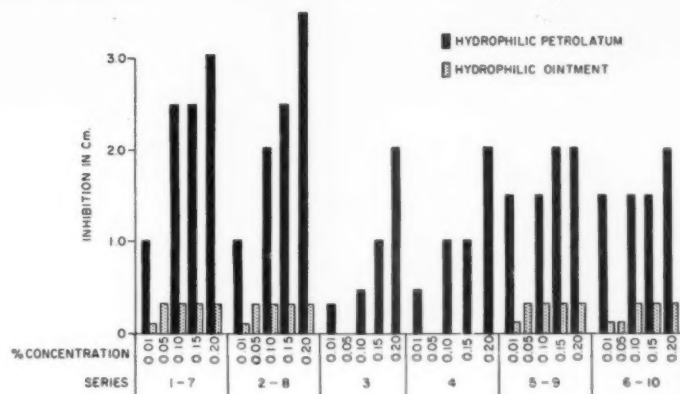


FIG. 1 - HEXACHLOROPHENE

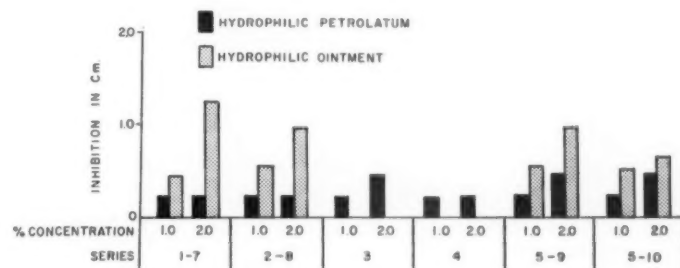


FIG. 2 - MERBROMIN

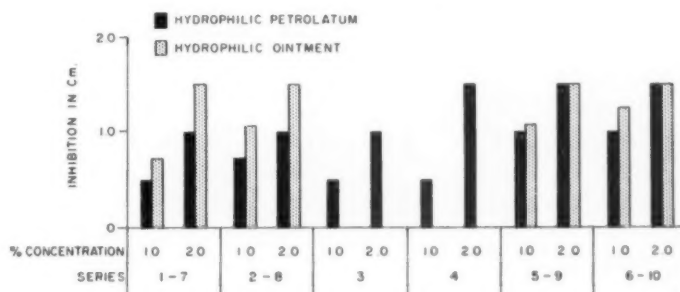


FIG. 3 - NOVOBIOCIN

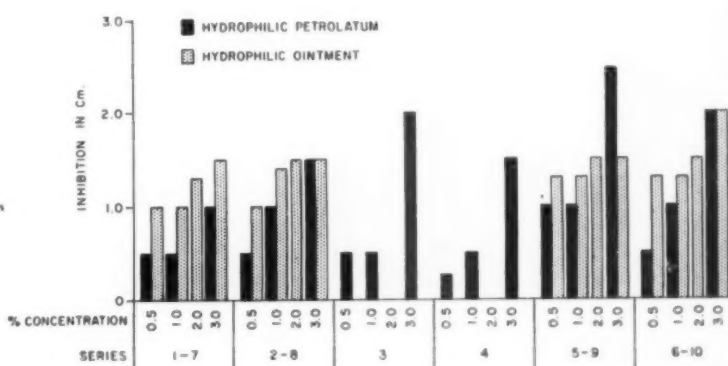


FIG. 4 - OXYTETRACYCLINE

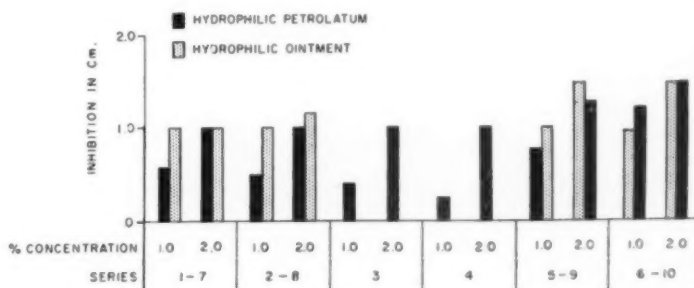


FIG. 5 - ERYTHROMYCIN

a spectrophotometric procedure
for determining

TOTAL PROTEIN IN ALLERGENIC EXTRACTS

by E. C. BRENNAN

Background

► A REVIEW OF THE LITERATURE REVEALS THAT AT THE present time there are four commonly used methods for standardizing allergenic extracts. Probably the most widely used of these methods is standardization according to weight, volume, or percentage. Using this method concentrations of allergenic extracts are expressed as 1 percent, 1:100, etc.

Another method used is the pollen unit of Noon, the English allergist. Noon designated 1 gram of dry pollen as containing 1,000,000 pollen units. Thus a 1 percent pollen extract contains 1,000,000 units per 100 ml. or 10,000 units per ml. Stated another way, 1 unit is equivalent to 0.001 mg. of pollen.

Pollen extracts are also standardized according to total nitrogen content expressed as decimal fractions of milligrams. This nitrogen measurement includes non-protein as well as protein nitrogen. It is generally felt that this method is not an accurate measure of the protein content of the extract.

The fourth method, and the method considered to be the more accurate of the four mentioned, is the use of the protein-nitrogen unit. The protein nitrogen unit represents only the nitrogen from a protein source and does not include the non-protein nitrogen of the extract. This method is considered to be the more accurate index of antigenic potency because the current consensus points to protein as the actual allergen in pollen extracts. Protein nitrogen is used as a quantitative index of the amount of protein in the extract. A

problem presents itself in the use of this method, however, as the analytical procedures developed thus far, *e.g.*, the micro-Kjeldahl procedure, are time-consuming, require the services of a technician with considerable experience in micro-analytical techniques, and require special equipment. Since none of these are usually readily available to the hospital pharmacist, it was felt that a need existed for an analytical procedure which would be both accurate and comparatively simple to carry out.

In an attempt to fulfill this need, the pharmacy intern at USPHS Hospital, New Orleans, La., in 1956, Mr. Jerry W. Matson, reported *A Spectrophotometric Procedure for Determining Protein Nitrogen in Ragweed Pollen Extracts*. This unpublished paper outlined a biuret colorimetric procedure claimed to produce accurate results in a fraction of the time needed for the micro-Kjeldahl technique.

Objectives

This study is an outgrowth and application of the technique developed by Mr. Matson. Specifically, it was the objective of this investigator to determine whether or not the spectrophotometric procedure which had been used successfully with ragweed pollen extracts could be applied with equal success to other pollen extracts.

Plan of Study

Extracts of 10 different varieties of pollen were made in 1:10 and 1:20 concentrations, and these were sterilized by Seitz filtration. Triplicate samples of each of the 20 extracts were then treated as described below, and the resultant values were interpreted using a standard curve of values, also described below. The

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determination procedure used was the biuret method, known to be applicable to protein solutions of this general type.

Equipment Used

1. Coleman Jr. Spectrophotometer, Model 6B
2. Centrifuge
3. Biuret Reagent
4. Glycerosaline Extracting Fluid consisting of:
 - a. Glycerin 46 percent
 - b. Sodium Chloride 4 percent
 - c. Distilled water, to make, 100 percent
5. Phosphotungstic Acid Solution consisting of 10 percent phosphotungstic acid in dilute hydrochloric acid.
6. Standard Protein Solution (Pro-Sol—Standard Scientific)

Preparation of Extracts

1. The desired quantity of dry pollen was weighed. In this work, concentrations of 1:10 and 1:20 were used.
2. The pollen was defatted using petroleum benzin. An anhydrous, alcohol-free reagent was required inasmuch as it has been shown that alcohol destroys antigenic potency.
3. The dried, defatted pollen was extracted with glycerosaline extracting fluid for 72 hours.

4. The preparation was then passed through ordinary filter paper to remove the solid particles.

5. The crude extract was passed through a Seitz filter. While it was not necessary to sterilize the extracts for this work, it was felt that the Seitz filtration should be carried out, due to the fact that it has been demonstrated that Seitz filtration has an effect on the antigenic potency of allergenic extracts.

In this study extracts of the following pollens were prepared using the method outlined above:

1. Timothy
2. Corn
3. Birch
4. Red Oak
5. English Plantain
6. Broad-leaved Cat-tail
7. Orchard Grass
8. Sour-dock Sheep Sorrel
9. Hazelnut
10. Giant Ragweed

Preparation of Standard Curve

A standard curve of values was required in order to evaluate the absorbancies obtained in the standardization procedure. This curve was prepared by the use of a standard protein solution. A series of dilutions of this standard was made, the concentrations of the dilutions being determined by the expected concentrations of

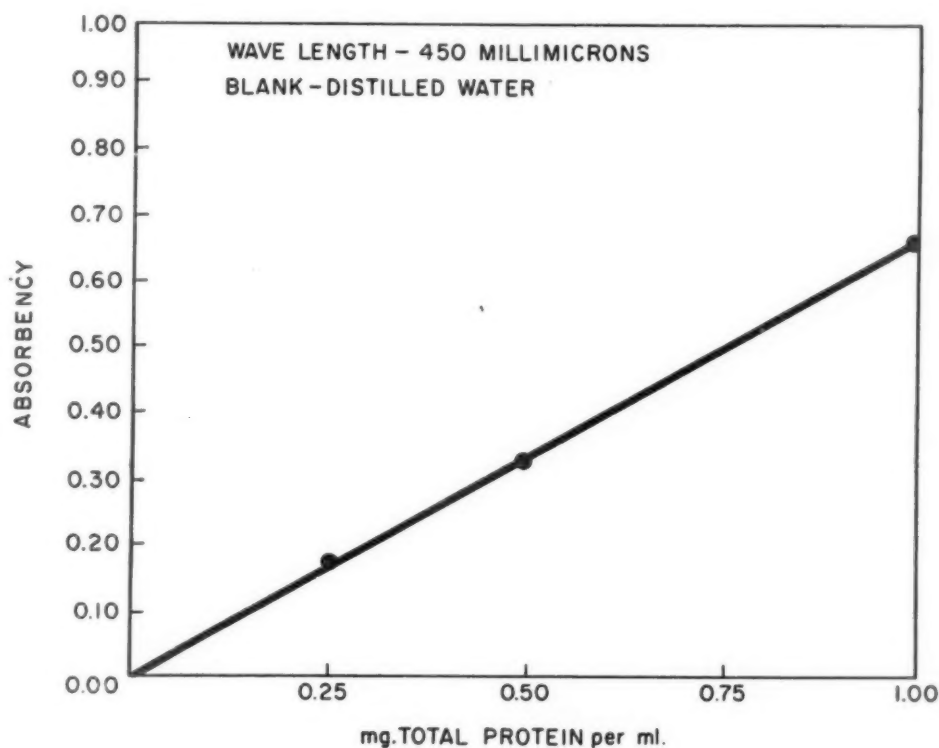


Figure 1 — Standard Curve obtained with dilutions of a standard protein solution.

Table 1. Absorbance Obtained with Standard Protein Solutions				
MG. TOTAL PROTEIN PER ML.	ABSORBANCE			
	I	II	III	
0.25	0.180	0.190	0.180	
0.50	0.340	0.330	0.340	
1.00	0.680	0.680	0.670	

Table 2. Absorbancies of Various Pollen Extracts at 450 Millimicrons Using Distilled Water as the Blank.

POLLEN EXTRACT	CONCENTRATION OF EXTRACT	ABSORBANCE		
		SAMPLE #		
		1	2	3
Timothy	1:10	0.590	0.580	0.580
Timothy	1:20	0.280	0.280	0.270
Corn	1:10	0.570	0.580	0.570
Corn	1:20	0.270	0.270	0.270
Birch	1:10	0.580	0.590	0.590
Birch	1:20	0.280	0.280	0.280
Red Oak	1:10	0.560	0.570	0.560
Red Oak	1:20	0.260	0.280	0.270
English Plantain	1:10	0.570	0.570	0.560
English Plantain	1:20	0.250	0.280	0.270
Cattail	1:10	0.600	0.590	0.600
Cattail	1:20	0.290	0.300	0.300
Orchard Grass	1:10	0.570	0.560	0.560
Orchard Grass	1:20	0.260	0.270	0.260
Sour-dock Sheep Sorrel	1:10	0.550	0.570	0.560
Sour-dock Sheep Sorrel	1:20	0.260	0.270	0.270
Hazelnut	1:10	0.620	0.610	0.600
Hazelnut	1:20	0.300	0.310	0.300
Ragweed	1:10	0.580	0.580	0.580
Ragweed	1:20	0.260	0.270	0.270

protein in the solutions to be compared with the curve. In this work the following dilutions were prepared:

1. 0.25 mg. of total protein per ml.
2. 0.50 mg. of total protein per ml.
3. 1.00 mg. of total protein per ml.

Triplicate samples of each of these dilutions were prepared in the same manner as that described below in the standardization procedure. The absorbance of each of the resultant solutions was then determined on the spectrophotometer at a wave length of 450 millimicrons using distilled water as the blank (see Table 1).

A graph of these values was constructed plotting total protein concentration in milligrams per milliliter on the abscissa and absorbance on the ordinate (see Figure 1).

Standardization Procedure

A. Precipitation of the protein:

1. The unknown pollen extract to be tested was slightly acidified with 10 percent hydrochloric acid.
2. The acidified extract was treated with an excess of 10 percent phosphotungstic acid in dilute hydrochloric acid.

3. The resultant precipitate was allowed to settle and subsequently centrifuged. This precipitate represents only the protein fraction of the extract.

4. The supernatant liquid containing the non-protein nitrogen was decanted, and the precipitate was redissolved in 5 percent sodium hydroxide solution. In the original work a 1 percent sodium hydroxide solution was used to redissolve the precipitate, however, in this study it was found that a 1 percent solution would dissolve only the precipitate from the ragweed pollen extract. Further study demonstrated that a 5 percent sodium hydroxide solution was the lowest concentration that could be used effectively for all the extracts.

B. Determination of total protein:

1. One milliliter of the protein solution to be tested was pipetted into a 10 ml. graduated cylinder.

2. The protein solution was diluted to 5 ml. with distilled water and 5 ml. of biuret reagent were added.

3. After thorough mixing, the solution was transferred to a cuvette and allowed to stand for not less than 30 minutes to enable the color complex to form. It was noted that the color complex formed is apparently quite stable and is not noticeably affected by small temperature changes.

4. The absorbance of the solution was determined at a wave-length of 450 millimicrons using distilled water as the blank. The results were then tabulated (see Table 2).

5. By comparing the absorbance of the unknown with the previously prepared standard curve of values, the total protein content of the allergenic extract in mg. of total protein per ml. was determined (see Table 3).

C. Converting total protein values to protein nitrogen values:

While not necessary, it is sometimes desirable to convert total protein values to protein nitrogen values, e.g., when it is desired to check the results obtained spectrophotometrically against results obtained using the micro-Kjeldahl procedure. This can be done by the use of a modified Kjeldahl factor:

$$\frac{\text{mg. total protein per ml.}}{6.25} = \text{mg. protein nitrogen per ml.}$$

Table 4 shows the relationship of protein nitrogen values to the total protein values obtained in this study.

Summary

A spectrophotometric procedure for the standardization of pollen extracts has been described in which biuret reagent is employed to produce the color. In comparison to other methods for standardizing pollen extracts on the basis of total protein content, this procedure has the advantages of being less time-consuming, not requiring special equipment other than that which is usually found in the hospital, and not requiring personnel with training in specialized fields other than pharmacy.

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Table 3. Total Protein Content of Various Pollen Extracts

POLLEN EXTRACT	CONCENTRATION OF EXTRACT	MG. OF TOTAL PROTEIN PER ML.			
		SAMPLE #			AVERAGE
		1	2	3	
Timothy	1:10	0.87	0.86	0.86	0.86
Timothy	1:20	0.41	0.41	0.40	0.41
Corn	1:10	0.83	0.85	0.83	0.84
Corn	1:20	0.40	0.40	0.40	0.40
Birch	1:10	0.87	0.88	0.88	0.88
Birch	1:20	0.41	0.41	0.41	0.41
Red Oak	1:10	0.82	0.83	0.83	0.83
Red Oak	1:20	0.39	0.40	0.41	0.40
English Plantain	1:10	0.84	0.84	0.83	0.84
English Plantain	1:20	0.36	0.39	0.38	0.38
Cattail	1:10	0.89	0.88	0.89	0.89
Cattail	1:20	0.43	0.44	0.44	0.44
Orchard Grass	1:10	0.85	0.84	0.84	0.84
Orchard Grass	1:20	0.38	0.39	0.38	0.38
Sour-dock Sheep Sorrel	1:10	0.83	0.84	0.85	0.84
Sour-dock Sheep Sorrel	1:20	0.39	0.40	0.40	0.40
Hazelnut	1:10	0.92	0.91	0.90	0.91
Hazelnut	1:20	0.45	0.46	0.45	0.46
Ragweed	1:10	0.86	0.86	0.86	0.86
Ragweed	1:20	0.39	0.40	0.40	0.40

Table 4. Relationship Between Protein Nitrogen and Total Protein Values
References

POLLEN EXTRACT	CONCENTRATION OF EXTRACT	TOTAL PROTEIN IN	PROTEIN NITROGEN IN
		MG./ML.	MG./ML.
Timothy	1:10	0.86	0.14
Timothy	1:20	0.41	0.07
Corn	1:10	0.84	0.13
Corn	1:20	0.40	0.06
Birch	1:10	0.88	0.14
Birch	1:20	0.41	0.07
Red Oak	1:10	0.83	0.13
Red Oak	1:20	0.40	0.06
English Plantain	1:10	0.84	0.13
English Plantain	1:20	0.38	0.06
Cattail	1:10	0.89	0.14
Cattail	1:20	0.44	0.07
Orchard Grass	1:10	0.84	0.13
Orchard Grass	1:20	0.38	0.06
Sour-dock Sheep Sorrel	1:10	0.84	0.13
Sour-dock Sheep Sorrel	1:20	0.40	0.06
Hazelnut	1:10	0.91	0.15
Hazelnut	1:20	0.46	0.07
Ragweed	1:10	0.86	0.14
Ragweed	1:20	0.40	0.06

Therapeutic Trends

edited by WILLIAM JOHNSON

A New Local Anesthetic

d-n-Propylamino-2-methyl-propionanilide (L 67), first synthesized in 1953, was tested on animals and compared with lidocaine by Wiending as reported in *Acta Pharmacol. et Toxicol.* 17:233 (Nov.) 1960. The magnitude of local anesthetic action, effect on blood pressure, and antagonism to spasms induced by acetylcholine, histamine or barium ions were of the same order as those of lidocaine. Although it was difficult in animal experiments to establish any clear-cut differences in the actions of the two drugs, the LD₅₀ of L 67 was found to be 65 percent higher than that of lidocaine, making its toxicity about 60 percent of lidocaine's.

KENNETH W. HUCKENDUBLER

Topical Corticosteroid Therapy In Ulcerative Colitis

A study was undertaken to assess the effect of topical steroid administered rectally and to compare this effect with that of systemically administered corticosteroids. The results of this study are reported in *Canadian Med. Assoc. J.* 83:1295 (Dec.) 1960 by O'Sullivan. Hydrocortisone succinate was administered rectally, usually daily, 100 mg. being dissolved in 4 oz. of saline and administered as a rectal drip over a period of about one hour. In a few instances when there was some doubt that an adequate amount of the solution would be retained, the instillation was given twice daily. The clinical study was made using 48 patients with ulcerative colitis. Treatment was beneficial in 32 of the 48 patients and, in general, was as effective as systemically administered corticosteroid and without systemic side effects. Preliminary studies indicated that the use of rectal suppositories which contain hydrocortisone may be a convenient method of topical therapy in certain patients with ulcerative colitis.

KENNETH W. HUCKENDUBLER

A New Antitussive Agent

Chlophedianol, structurally related to diphenhydramine, has been found to have antitussive, local anesthetic and antispasmodic activity. Boyd and Boyd, reporting in *Canadian Med. Assoc. J.* 83:1289 (Dec.) 1960, studied the effect of chlophedianol hydrochloride upon the volume output of respiratory tract fluid. The study was conducted upon lightly anesthetized rabbits and

cats. The drug was administered orally and subcutaneously in doses ranging from therapeutic to toxic levels and was found to produce a slight but significant lowering of the volume output of respiratory fluid. The authors suggest that drugs which augment the output of respiratory fluid should be given as adjuvants and correctives when chlophedianol hydrochloride is used as an antitussive agent against cough associated with a decreased output of respiratory tract fluid ("dry" coughs).

KENNETH W. HUCKENDUBLER

Piperidinoethyl-3-Methylflavone-8-Carboxylate Hydrochloride

Flavone and a number of chromone derivatives have shown smooth muscle relaxant properties. Research was conducted on basic derivatives of chromone carboxylic acids. This report deals with a compound which was the most effective as a smooth muscle relaxant of the series. The compound is piperidinoethyl-3-methylflavone-8-carboxylate hydrochloride. The compound labeled Rec 7-0040 was studied by Setnikar *et al.* They reported their findings in *J. Pharmacol. Exp. Therap.* 130:356 (Nov.) 1960. Rec 7-0040 is a papaverine-like drug, considered to be free of atropine-like action. For evaluation, the drug may be compared to papaverine. Rec 7-0040 was less active than papaverine in counteracting the intestinal contractions induced by barium chloride. The new compound was found to have pronounced analgesic and local anesthetic properties. Rec 7-0040 should be borne in mind when a spastic condition is sustained by pain stimuli as often happens in the case of ulcerous or inflammatory conditions of the digestive tract. Rec 7-0040 was found to be active when administered orally.

RICHARD H. HARRISON

Effects Of TMB-4 On Cholinesterase Activity And Neuromuscular Block Following Poisoning With Sarin And DFP

The drug TMB-4 was first reported to be superior to 2-PAM as an adjuvant to atropine against sarin. This study, conducted by Fleisher *et al.*, reports the effects (of TMB-4 administered to rats after poisoning with sarin) on the cholinesterase activity of the red blood cells, diaphragm and brain. It has been previously demonstrated that atropine can relieve the

respiratory center of paralysis induced by DFP. Atropine, however, had no influence on the peripheral depression of skeletal muscle including the diaphragm. The study was reported in *J. Pharmacol. Exp. Therap.* 130:461 (Dec.) 1960. TMB-4 was shown to be effective in reversing the neuromuscular blockage caused by the organophosphorous compound DFP. TMB-4 was also found to be effective in reactivating the cholinesterase activity of intact rat diaphragm muscle after poisoning with DFP *in vitro* and sarin *in vivo*. Like other oximes, TMB-4 was unable to cross the blood brain barrier. This was evidenced in the study by the lack of reactivation of brain cholinesterase following the treatment with TMB-4. The minimum time required to obtain measurable cholinesterase activity *in vitro* and *in vivo* by TMB-4 in intact muscle cholinesterase was 10 minutes. This rapid return is under further study.

RICHARD H. HARRISON

Neo-Gel, A New Antacid

The clinical results of the antacid properties of hydrated colloidal tricalcium phosphate, $\text{Ca}_3(\text{PO}_4)_2 \cdot n\text{H}_2\text{O}$, with and without magnesium trisilicate have been reported by Figueroa and Klotz of the Department of Medicine, University of Kansas Medical Center, in *Current Therapeutic Research* 3:5 (Jan.) 1961. Thirty-six patients all having high acid secretory activity were used in this clinical test. They were divided into two equal groups, one exhibiting duodenal ulcers and the other high gastric acid activity with no duodenal ulcers. It was found that when 20 ml. of Neo-Gel was administered hourly with magnesium trisilicate to the first group, results were good in 100 percent of the cases as compared to 67 percent good and 33 percent fair in the second group. When magnesium trisilicate was not administered with the Neo-Gel, the results were significantly reduced. It was observed that Neo-Gel exerts a relatively stable change in pH as compared to sudden marked changes from high to low brought about by other less effective preparations studied. No side effects were observed from the use of this antacid.

WILLIAM C. THAYER

Studies Of Hepatic Function With Indocyanine Green

The high percentage of recovery of indocyanine green (Cardio-Green) from the bile as compared to sulfobromophthalein, and the sustained exponential plasma disappearance is suggested by Hunton *et al.* in *Gastroenterology* 39:713, (Dec.) 1960, as being useful in assessing hepatic function. The authors note that a comparison with the sulfobromophthalein test suggests that removal of indocyanine green may be of clinical value, especially in patients who have spurious retention of sulfobromophthalein. Evidence is pre-

sented which indicates that plasma disappearance of indocyanine green may permit independent assessment of hepatocellular injury in the presence of jaundice. Cardio-Green was supplied by Hynson, Westcott and Dunning, Inc.

KENNETH W. HUCKENDUBLER

R 1132—A New Constipating Drug

The therapeutic value of R 1132 (diphenoxylate hydrochloride) was studied in 10 ileostomy patients during 6 months of treatment. Eight patients benefited from the treatment. Although the pharmacologic basis of its constipating activity has not yet been assessed, Van Derstropfen, *et al.* reporting in *Gastroenterology* 39:725 (Dec.) 1960, believe that because it is chemically related to morphine derivatives it probably acts by increasing the tone and decreasing the propulsive activity of the bowel, thus permitting an increased absorption of water. Acute withdrawal of the drug did not cause significant symptoms.

KENNETH W. HUCKENDUBLER

Comparative Study Of The Effects Of Methylphenidate And A New Piperidine Compound (SCH 5472)

Evaluation of diphenylmethylhydroxymethylpiperidine (SCH 5472) and methylphenidate was carried out on a total of 78 patients of whom 65 were followed long enough to judge the clinical effectiveness of the agent. Doses ranged from 0.25 to 3 mg. daily and 20 to 120 mg. daily respectively. Particularly favorable response occurred in patients with exhaustion syndrome and neurotic depression or in hypersomnia with more than three-fourths of the patients responding favorably. No serious toxic effects occurred clinically nor did repeated laboratory studies of blood, urine, and liver function show abnormality. P. Siegler *et al.* further point out in *Current Therapeutic Research* 2:543 (Nov.) 1960 that clinical side effects were minimal and rarely required discontinuation of the drugs. Improved psychomotor performance, however, was not observed with either drug.

SYLVIA SCHMIDT

Sodium Cyanide As Anti-Cancer Agent

A preliminary report has been made by Brown *et al.* in the *Am. J. Obstet. Gynecol.* 80:907 (Nov.) 1960, on the use of sodium cyanide as a cancer chemotherapeutic agent. The authors state that suggestive evidence is presented that differential tumor toxicity is obtained and is manifested by a prolongation of survival time in experimental animals and by cellular changes in clinical tumors. These observations indicate that the sodium cyanide anesthetic mixtures used were reasonably well tolerated without evidence of chronic toxicity or cumulative effect. Work regarding the action of the drug against tumors is being continued.

KENNETH W. HUCKENDUBLER

Timely Drugs

Forhistal

GENERIC AND CHEMICAL NAMES: Dimethpyrindene maleate; 2-[(1-(2-(2-dimethylaminoethyl)-3-indenyl) ethyl)]-pyridine maleate.

INDICATIONS: Antihistaminic action in cases of respiratory and ocular allergies, pruritus and allergic dermatoses.

SIDE EFFECTS: Primarily drowsiness or sedation; infrequently, dryness of mouth, gastrointestinal discomfort, nausea or diarrhea, stimulation, insomnia or irritability, dizziness, headache, bladder discomfort and increased nocturia.

DOSAGE: Adults and children over 6 years: one Lontab one or two times daily; one or two tablets one to three times daily; syrup, one or two teaspoonsful 1 to t.i.d. Children under 6 years: pediatric drops, 0.25 mg. (0.3 ml.) to 0.5 mg. (0.6 ml.) b.i.d. or t.i.d.

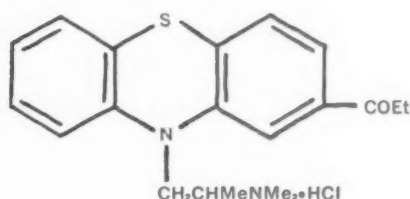
PREPARATIONS: Lontabs (sustained action tablets) of 2.5 mg.; tablets of 1 mg.; syrup containing 1 mg. per 5 ml.; pediatric drops of 0.5 mg. per 0.6 ml.

PACKAGING: Lontabs and tablets, bottles of 100; syrup, 4 oz.; pediatric drops, 1 oz. bottle with calibrated dropper.

SUPPLIER: Ciba.

Largon

GENERIC AND CHEMICAL NAMES: Propiomazine hydrochloride; 1-[10-(2-dimethylaminopropyl) phenothiazin-2-yl]-1-propanone hydrochloride.



INDICATIONS: A central nervous system depressant with antihistaminic activity used as a sedative and adjunct to anesthesia and analgesia in obstetrics and surgery.

SIDE EFFECTS, PRECAUTIONS AND CONTRAINDICATIONS: Perivascular extravasation should be avoided since the chemical irritation may be severe. Intra-arterial injection is contraindicated. It should be administered with caution to ambulatory patients because of the sedative action. Such patients should be cautioned against driving automobiles or operating dangerous machinery.

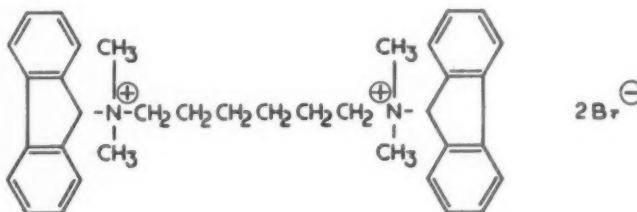
DOSAGE: Administered by intravenous or intramuscular route in dosages of 10 to 30 mg. Intravenous injections should only be made into vessels previously undamaged by multiple injections or trauma. Because propiomazine enhances the effects of central nervous system depressants, the dose of barbiturates should be eliminated or reduced by at least 1/2, and doses of meperidine, morphine and other analgesic depressants reduced by 1/4 to 1/2.

PREPARATIONS: Solution for injection containing 20 mg. propiomazine hydrochloride per ml.

PACKAGING: Ampuls of 1 and 2 ml. in packages of 25.
SUPPLIER: Wyeth

Mylaxen

GENERIC AND CHEMICAL NAMES: Hexafluorenium bromide; hexamethylene bis-(9-fluorenyldimethylammonium)-dibromide.



INDICATIONS: Neuromuscular blocking agent, used primarily in conjunction with succinylcholine to produce surgical relaxation with fewer side effects than when succinylcholine is used alone.

SIDE EFFECTS AND PRECAUTIONS: Cardiac irregularities, hypotension, and bronchio-spasms not yet reported, however, precaution is advised in patients with bronchial asthma. Usual precautions pertaining to combinations with succinylcholine, i.e., provision for assisted respiration, should be observed.

DOSAGE: Recommended ratio of dosage of hexafluorenium to succinylcholine (given by intermittent intravenous administration or by the drip or continuous infusion technique) varies depending upon the type and duration of the operation.

PREPARATIONS: Solutions for injection containing 20 mg. hexafluorenium per ml.

PACKAGING: Multiple dose vials, 10 ml.

SUPPLIER: Irwin, Neisler and Company.

Nacton

GENERIC NAME: Poldine methylsulfate.

INDICATIONS: Antisolinergic agent used on gastric hypersecretory and gastrointestinal states such as peptic ulcers, hyperchlorhydria, pancreatitis, enteritis, gastritis, etc.

SIDE EFFECTS: Depending upon the dose level, dryness of the mouth, interference with vision, constipation, difficulty in micturition and tachycardia can be elicited.

PRECAUTIONS: Caution advised in patients with glaucoma, prostatic hypertrophy, pyloric obstruction, coronary artery disease and tachycardia.

DOSAGE: One tablet (4 mg.) three or four times daily, before meals and at bedtime.

PREPARATIONS: Tablets (pink) containing 4 mg. poldine methylsulfate.

PACKAGING: Bottles of 100 and 500 tablets.

SUPPLIER: McNeil Laboratories.



CONTROL OF POISONINGS

edited by ALBERT L. PICCHIONI, Director, Arizona Poisoning Control Program

Acute Iron Poisoning

► A CASE IN WHICH A ONE-YEAR-OLD GIRL was fed 40 ferrous sulfate tablets (total of 12 grams) by a 2-year-old brother was recently reported by the Boston Poison Information Center and the Children's Hospital Medical Center.¹ Within 2 hours the child was taken to the emergency room in a cyanotic state, unresponsive, and in shock. Her stomach was evacuated by lavage with a sodium bicarbonate solution and exchange transfusion was instituted. Despite these measures the victim died 5 hours after ingestion of the iron tablets.

Although iron preparations are considered to have a relatively wide margin of safety, the above case serves to emphasize the serious consequences of acute poisoning from the ingestion of large doses. The extensive use of iron preparations, particularly ferrous sulfate, for the treatment of anemia in recent years has increased the opportunity for accidental iron poisoning. The colored sugar-coating of the tablets gives them the appearance of candy and makes them particularly attractive to children. The signs and symptoms of iron poisoning are chiefly associated with gastrointestinal irritation and necrosis, and shock; they also include cyanosis, drowsiness, hematemesis, tarry stools, and cardiovascular collapse. The shock syndrome has been attributed to the excess production of ferritin² and to local tissue damage.³

Three critical phases in iron poisoning may be observed: (1) an early phase of acute shock that occurs within a few hours after poisoning, (2) a recurrent phase that appears one to two days after poisoning, and (3) occasionally a late phase of pyloric stenosis. Death may occur after apparent recovery. The exact cause of death in iron poisoning is not clear. Fatality has occurred from the ingestion of 40 to 1600 mg. of ferrous sulfate per kilogram of body weight.³

The treatment for iron poisoning is mainly symptomatic. The A.M.A. Committee on Toxicology³ directs that milk should be given immediately and vomiting induced. Gastric lavage should be performed with the use of a 5 percent aqueous solution of monosodium phosphate or disodium phosphate. In the case of children 1 or 2 years old, 2 or 3 ounces of the solution

should be left in the stomach and proportionally greater amounts in older patients. Bismuth subcarbonate, 200 mg., may be administered every four hours to young children. Dehydration should be corrected by the intravenous infusion of 5 percent glucose in saline solution. If shock is severe, transfusion with plasma or whole blood should be instituted. Consideration may be given to the intravenous injection of edathamil calcium disodium (calcium disodium versenate) and oxygen should be administered if needed. Exchange transfusion has proved useful in severe poisoning and may be employed. Antibiotics should be administered as prophylaxis against pneumonia and other intercurrent infections. Dimercaprol (BAL) should not be employed because it forms a toxic complex with iron.²

In view of the common use of iron preparations and in view of the grave consequences associated with the ingestion of massive amounts of ferrous sulfate or similar drugs, the Arizona Poisoning Control Information Center urges physicians and pharmacists to warn patients to keep these prescriptions out of reach of children.

Acute Toxicity of Psychopharmacologic Drugs

Information on the acute toxicity of psychopharmacologic drugs in humans has recently been summarized and published by the National Clearinghouse for Poison Control Centers.⁴ This information is based on 280 cases of accidental ingestion and overdosage involving "tranquilizer" agents reported by 60 poison control centers over a two-year period. Children younger than five years of age were involved in 62.2 percent of all reported incidents, and over one-fourth of these children had toxic manifestations.

Varying degrees of central nervous system depression, hypotension, convulsions and extrapyramidal-tract motor activity were reported following ingestion of phenothiazine derivatives. The extrapyramidal-tract activity, which included muscle spasms, rigidity, convulsive twitching, tremor, oculogyric crises, was reported after prochlorperazine and perphenazine. The latter toxic effect followed single ingestion of these drugs in amounts ranging from 5 to 36 times the usual therapeutic dose.

The symptoms found most frequently after ingestion of single, larger than therapeutic, doses of the rauwolfia derivatives were mild central nervous system depression (drowsiness, lethargy, and stupor) and flushing. No serious toxic manifestations were reported following ingestion of single doses of these drugs.

Mild central nervous system depression, coma and hypotension were reported most frequently following meprobamate ingestion. Mild depression was also noted in a few cases involving benactyzine, phenaglycodal and hydroxyzine.

The report from the National Clearinghouse for Poison Control Centers also presents suggestions for the management of overdose from these psychopharmacologic agents. Evacuation of the stomach as soon as possible after ingestion is recommended. Gastric lavage may be the preferred method for emptying the stomach following ingestion of the phenothiazine derivatives. Attempts to induce emesis may be unsuccessful, because of the anti-emetic action of these drugs.⁴

There are no specific antidotes for the treatment of poisoning from the psychopharmacologic agents. Hence, symptomatic and supportive therapy is employed. In cases of coma, it is recommended that treatment be directed toward maintenance of adequate pulmonary ventilation, adequate circulation, fluid and electrolyte balance and nutrition of the patient. Levarterenol is suggested for the treatment of phenothiazine-induced hypotension.⁴

Blumberg and co-workers⁵ suggest the use of whole blood, plasma or plasma expanders in the treatment of hypotension in severe meprobamate intoxication. On the other hand, Ferguson and co-workers⁶ recommend the use of vasopressor agents, such as metaraminol bitartrate or phenylephrine in the treatment of meprobamate-induced hypotension.

It is suggested that extracorporeal hemodialysis or exchange transfusion may be useful in the treatment of selected cases of severe meprobamate poisoning. In the case of severe chlorpromazine intoxication, exchange transfusion may be preferred to dialysis, since this drug is tightly bound to circulating plasma proteins.⁴

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Enactment of New Federal Hazardous Labeling Act^{1,2}

On July 11, 1960, the President of the United States signed the Uniform Hazardous Substance Act. This act became effective immediately upon enactment, but no penalty or condemnation may be enforced for violation of the act until 6 months after the above date. The new bill specifically regulates the labeling of hazardous substances for non-manufacturing purposes which were not covered by pre-existing Federal laws. It also delineates penalties to be assessed for violations.

Hazardous substances are described as those which are toxic, corrosive, irritating, sensitizing, flammable, or explosive under customary or reasonably anticipated conditions of handling and use. Under this legislation, manufacturers of products which contain hazardous substances are required to label the containers of these materials with the following information: (a) name and address of manufacturer, packer, or distributor, (b) the common, usual, chemical, or generic name of each ingredient which contributes to the hazard of the product, (c) an appropriate signal word such as "DANGER," "WARNING," or "CAUTION," (d) an affirmative statement of the principal hazard or hazards, such as "Flammable," "Vapor Harmful," "Causes Burns," "Absorbed Through Skin," etc., (e) precautionary measures describing the action to be followed or avoided, (f) first-aid instructions for treatment of injury or poisoning due to the product, (g) the word "poison" in red on a contrasting background and skull and crossbones for "highly toxic" substances, (h) instructions for handling and storage if such is necessary, and (i) a warning to keep the product out of reach of children. The above information is to be printed in English, prominently and legibly. A product is considered misbranded if it falls under the provisions of this act, but is not labeled as specified.

The new law will be administered by the Food and Drug Administration under provisions of the Federal Food, Drug, and Cosmetic Act. In the event that human or clinical experience with any substance shows results different from those obtained on experimental animals, the Secretary of Health, Education, and Welfare has the authority to require the use of the signal word "DANGER" or permit use of a less urgent term such as "WARNING" or "CAUTION" on such a substance.

References

1. National Clearinghouse for Poison Control Centers Bulletin, August, 1960.
2. Hidden Hazards: *The Unlabeled Poison Problem*, a Pamphlet from the Committee on Toxicology, American Medical Association.

Consulting

WITH BOWLES

GROVER C. BOWLES JR., Baptist Memorial Hospital, Memphis, Tennessee

► Can pyrogen tests be performed satisfactorily in the hospital?

Yes — following the U.S.P. method, pharmacists or hospital laboratory personnel can carry out pyrogen tests in a satisfactory manner.

► Is there any objection to placing labels on plastic tablet and capsule vials inside the vial rather than glueing them on the outside?

There is no objection to placing the label on the inside of the vial. However, the label should be affixed to the container in such a manner that it cannot be easily separated or moved from one container to another.

► Are atropine and scopolamine handled as narcotics or as regular floor stock?

No. There is no reason why atropine or scopolamine should be accounted for as narcotics. Such accounting merely adds to the already too heavy paper work of the nurse. Of course, when the drugs are in combination with narcotics, such as atropine-morphine injection, each dose must be accounted for in the usual manner.

► During recent years we have heard a great deal about the opportunities for research in hospital pharmacy. May we please have a down-to-earth definition of research?

To the hospital pharmacist, I think research means looking for new ideas, a better way of doing things and for new solutions to old problems. Read "Opportunities for Research in Hospital Pharmacy" by Robert A. Statler, published in November 1960 issue of this JOURNAL.

► Should hospital pharmacists be active members of professional groups carrying out research on new drugs in the hospital?

Much would depend upon the extent of participation, the pharmacist, his ability and his interests. Not all hospital pharmacists are qualified to participate actively in complex research programs.

► What kind of contact do the majority of hospital pharmacists have with the medical and nursing staffs

to give and receive information about what is going on in the hospital?

Most of us depend largely on our informal contacts. By showing a sincere interest in what is going on around us and in making every effort to comply with requests for information and to fill special orders, you earn the mutual respect of other members of the hospital family. This mutual respect will provide the vehicle for a free exchange of information.

► Where can we find factual information about the use of tax-free alcohol?

The Internal Revenue Service Publication, No. 444 (9-60), entitled *Distribution and Use of Tax-Free Alcohol* has recently been distributed to hospitals using tax-free alcohol. This publication contains Part 213 of Title 26 (1954), Code of Federal Regulations and is the best source of factual information about the regulations dealing with the procurement, use and the method of accounting for tax-free alcohol. Additional copies of IRS Publication, No. 444 (9-60), are available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. The cost is 15c per copy.

► What is the tax on a gallon of alcohol?

The federal tax on alcohol is \$10.50 per proof gallon. The tax on one wine gallon of 200 proof is \$21.00 and \$19.95 per gallon of 190 proof.

► To whom should we apply for a permit to purchase tax-paid alcohol?

All correspondence about regulations and permits should be addressed to the Assistant Regional Commissioner, Alcohol and Tobacco Tax Division, Internal Revenue Service of the region in which your hospital is located. Offices are located in Atlanta, Ga.; Boston, Mass.; Chicago, Ill.; Cincinnati, Ohio; Dallas, Texas; New York, N. Y.; Omaha, Nebr.; Philadelphia, Pa. and San Francisco, Calif.

► How much tax-free alcohol can be purchased at any one time?

You may withdraw up to 1/6th of your annual allotment during any one calendar month, provided your bond is sufficient to cover all alcohol on hand, in transit and unaccounted for at any one time.

Pharmacy-Central Sterile Supply Services

edited by MILTON W. SKOLAUT, Chief, Pharmacy Department, Clinical Center, Bethesda, Maryland

Organization and Supervision (continued)

► THE CONCLUDING STATEMENT OF THE FIRST PART of this subject was as follows: "It will suffice to say that the Central Sterile Supply Service supervisor should have education or experience beyond the basic requirement of his individual discipline if he is to function well in this capacity."¹

To illustrate this point more fully, the major courses of instruction in three schools or colleges touching on the subject of central sterile supply are listed here:

From the courses offered, it will be seen the three schools do not graduate students who are experts in the operation of a Central Sterile Supply Service. It is probably correct to state that the nurse has a knowledge of how to use the patient materials, and some sterilizing techniques, and the pharmacist has a knowledge of drugs, packaging of materials, some sterilizing techniques, and knowledge of some items in the Service.

Therefore, both must learn techniques of packaging, assembly, complete sterilization services, supervision, etc. Generally speaking, neither would make a good supervisor, but each can learn to provide a full service. Here is where differences start to appear.

In determining patient needs, the pharmacist will consult with the users of the service (physicians and nurses) and must provide a safe product. The nurse, generally, will provide the same; however, frequently she (or he) will be influenced by the knowledge of the technique of use and will allow this to influence the preparation of the end product. This could be a real help but, frequently, it is a hindrance. The real need is to consult all users, arrive at a mutually agreeable end-product, and place it in production. For this, one need not know the exact method or technique of use since the users have been consulted.

There is no legal requirement as to who may prepare and dispense, within the hospital, the syringes, dressings, needles, and the majority of the sterile items. However, the preparation of certain solutions is regulated by many states and becomes a pharmacy responsibility. The nursing responsibility is administration or use on the patient. These responsibilities are covered by the nursing practice codes of the various states. These nursing laws do not cover the preparation of supplies.

As the hospital practice and the Central Sterile Supply products become more complicated by new supplies, there appears to be another major area of im-

portance which needs consideration. The toxicity of certain new plastic disposable items is of utmost importance. Industry does not test these products for many of the unusual applications to which they are adapted in a hospital atmosphere. A supervisor with knowledge and background in pharmacology would certainly be beneficial. It is well to examine the listing of education courses to determine which type of person has the most pharmacological training. A well informed supervisor of a Central Sterile Supply Service must have a thorough working knowledge of all phases of the Service. An outline of a proposed course in Central Sterile Supply Administration fairly represents the major points.⁵

PART I. THEORY AND GENERAL CONSIDERATIONS

I. DEFINITION OF TERMS

- A. General Nomenclature of Equipment and Supplies
 - 1. History and development of interesting equipment and supplies
 - 2. Development and need of standard nomenclature
- B. Other terminology

II. HISTORY AND DEVELOPMENT

- A. Of the "central" concept
 - 1. Decentralized *versus* centralized
- B. Of the germ theory
 - 1. Application of heat to destroy germs
- C. Of asepsis
 - 1. Medical
 - a. Sterilization
 - 2. Surgical
 - a. Sterilization
- D. Of wrappings
 - 1. Paper, muslin, cellophane, plastic, and others
- E. Of specific pieces of equipment and supplies
 - 1. In addition to items already covered in I,A,1
- F. Miscellaneous

III. STERILIZATION AND DISINFECTION

- A. Methods, including theory of each
 - 1. Gas, oil, steam, dry heat, radioactive, ultraviolet, chemical, ultrasonic, and others
 - 2. Elaboration on those most widely used in hospitals
- B. Disinfection
- C. Sterilization Control
 - 1. Color devices, melting devices, exhaust recording thermometers, thermocouple recording, automatic
 - 2. Bacteriological controls, cultures, as against 1
 - a. Standardization of cultures

IV. PURCHASING AND STOCK CONTROL

- A. Policies
- B. Specifications
 - 1. Quality
 - 2. Sources of supply
- C. Quotation, prices and discounts
- D. Preparation of orders and receipt of materials
- E. Stock arrangement
- F. Inventory and stock control

V. PERSONNEL

- A. Selection and in-service training
 1. Operational manual
- B. Use of visual aids and instructional devices

VI. ADVISORY COMMITTEE

- A. Membership
- B. Functions and Activities
- C. Potential problems

VII. ASSEMBLING, PACKAGING AND PREPARATION OF MATERIALS

- A. Dressings
- B. Trays, sets
- C. Intravenous and irrigating solutions

VIII. INTERDEPARTMENTAL PROCEDURES FOR CONTROL OF EQUIPMENT AND SUPPLIES

- A. Requisitions forms
- B. Requisitioning
- C. Delivery
 1. Central Messenger Service Departmental Messenger Service, Dumbwaiter, Nursing Unit Personnel Pick-up
- D. Return of used supplies
 1. Same as C-1
- E. Accountability
- F. Charges

IX. PHARMACY SUPERVISION OF MEDICAL AND SURGICAL SUPPLY

- A. Advantages and disadvantages
 1. How to overcome disadvantages
 - a. Nursing and Pharmacy Procedure Committee

PART II. INTRADEPARTMENTAL PROCEDURES INCLUDING THE OPERATIONAL MANUAL

I. RECEIPT AND STORAGE

II. PROCESSING OF SUPPLIES

- A. Check on reusability
- B. Cleaning
- C. Assembling
- D. Packaging
- E. Identification
 1. Labeling, coding and dating

F. Sterilization

G. Storage

H. Issuance

1. Dressings and bandages
2. Trays, sterile and clean
3. Instruments
4. Plastic, rubber, and associated items
5. Syringes
6. Needles
7. Glassware
8. Utensils
9. Parenteral and Irrigating Solution Manufacture
10. Administration sets
 - a. Blood, hypo, "Y," "I.V.," Irrigating, and others

III. PROCESSING OF EQUIPMENT

- A. Receipt and storage
- B. Cleaning
- C. Checking and maintenance
- D. Repairing
- E. Storage
- F. Issuance
 1. Instructions for use

IV. EQUIPMENT FOR LOAN

- A. Essential patient area equipment
- B. Orthopedic equipment
- C. Inhalation and oxygen therapy equipment

A person familiar with all of these subjects has the knowledge and background to be an excellent supervisor. In addition, he (or she) needs one other major qualification; that is the desire to give service willingly and generously.

Exactly who should supervise this area of hospital responsibility cannot be resolved by this writer. Each hospital must consider many factors, among which will be location of space, facilities, and personnel available. Then the best supervisor or area of responsible operation can be designated.

COURSE	UNIV. OF MARYLAND ² SCHOOL OF NURSING	THE JOHNS HOPKINS ³ SCHOOL OF NURSING	TEMPLE UNIV. ⁴ SCHOOL OF PHARM.
Gen. Chemistry	6 sem. hrs.	75 hrs. of lecture, demonstration & lab.	8 sem. hrs. 6 sem. hrs. 8 sem. hrs.
Gen. Physics			
Organic Chemistry			
Quantitative Chem.			
Microbiology	4 sem. hrs.	45 hrs. of lecture, demonstrations & lab.	5 sem. hrs. 7 sem. hrs. 12 sem. hrs.
Biochemistry	4 sem. hrs.		7 sem. hrs. 9 sem. hrs. 2 sem. hrs.
Administration (Pharm.)			
Physiology			
Pharmacology	3 sem. hrs.		
Law (Pharm.)			
Anatomy and Physiology	8 sem. hrs.	120 hrs. of lecture, demonstration & lab.	
Prin. of Management of a Nursing Unit	2 sem. hrs.	45 hrs. of lecture, demonstration & lab.	
Operating Room Nursing			

1. *Am. J. Hosp. Pharm.* 17:710 (Nov.) 1960.

2. A four year course leading to a degree of Bachelor of Science in Nursing.

3. A three year course fully recognized for license as a nurse.

4. A five year course leading to a degree of Bachelor of Science in Pharmacy.

5. From a report of the Subcommittee on Pharmacy-Operated Central Sterile Supply *Bull. Am. Soc. Hosp. Pharm.* 14:473 (July-Aug.) 1951.

News

Philadelphia College Offers Course in Preparation of Parenteral Products

For the eighth consecutive summer, the Philadelphia College of Pharmacy and Science will offer this year, from July 10 through 21, a postgraduate course in the preparation of parenteral products.

This two-week course is designed to provide fundamental training at postgraduate level in the theory and practice of parenteral product manufacture for those who wish to refresh their training in that respect; for research and production personnel who need the knowledge of the fundamentals of this pharmaceutical specialty; and for pharmaceutical educators and graduate students in pharmacy who desire the knowledge to be gained from an intensive specialized course of this type.

The fee for the complete two-weeks' course is \$100.00 and classes will be under the direction of Dr. Kenneth E. Avis, associate professor of pharmacy at the Philadelphia College. Further details may be obtained by addressing the Registrar.

Spring Appointed Secretary A.M.A. Council on Drugs

Dr. William C. Spring, Jr., formerly of Brooklyn, N. Y., has been appointed secretary of the American Medical Association's Council on Drugs.

Dr. Spring, who holds degrees from Wisconsin, Duke, and Columbia universities, succeeds Dr. Harold D. Kautz, who resigned last July 20 to accept a position with Abbott Laboratories, North Chicago, Ill.

Dr. Spring comes to the A.M.A. from the Chas. Pfizer and Company, Brooklyn, where until recently he had been serving as medical director of the laboratories division. Prior to that time, he was associate medical director of the J. B. Roerig Division, a Pfizer subsidiary.

The A.M.A. Council on Drugs is one of the oldest within the Association. Ever since its formation in 1905, when it was known as the Council on Pharmacy and Chemistry, the Council has reported to the medical profession on the reliability, therapeutic value, and limitations of pharmaceutical products.

Gdalmann Named to University of Illinois Faculty

Presbyterian-St. Luke's Hospital and the University of Illinois College of Pharmacy, Chicago, have joined forces to combine the clinical instruction of pharmacy with the classroom method. Students in their senior

year of pharmacy will gain experience on a rotating schedule in the pharmacy department of Presbyterian-St. Luke's Hospital.

Louis Gdalmann, director of pharmacy services at Presbyterian-St. Luke's who will direct the new teaching program, has been appointed to the faculty of the University of Illinois as a clinical instructor. He becomes the first clinical appointee to the College of Pharmacy.

Mr. Gdalmann has served Presbyterian-St. Luke's for over 30 years, and has established systems of control, production, distribution and service which are used in hospital pharmacies throughout the country.

► **DRUG TOPICS RED BOOK Cumulative Supplement** has recently been issued by Topics Publishing Company. The Supplement provides up-to-date cumulative information on new products, new sizes, price increases, price decreases, changes in product names, and discontinued items. In addition, there is included in it the names of new manufacturers of drug products. The format and style of the new January 1961 *Drug Topics Red Book Cumulative Supplement* closely follows that of the *Drug Topics Red Book*, simplifying its use.

Copies of the new January 1961 Supplement are available from the Directory Division, Topics Publishing Company, Inc., 10 East 15th Street, New York 3, N. Y. at \$2.00 each.

► **THE PLACE OF PHARMACY** in the United States Public Health Service was the subject of a talk by Dr. George F. Archambault to the junior and senior classes at Columbia University College of Pharmacy on February 2. Dr. Archambault is Chief of the Pharmacy Branch, Division of Hospitals, and Pharmacy Liaison Officer to the Office of the Surgeon General. In his discussion, Dr. Archambault pointed out the opportunities for professional service in hospital pharmacy practice, presented historical background on the U.S. Public Health Service and also discussed the pharmacy program in the PHS.

Reinstein Awarded Fulbright Lectureship

► **JEROME A. REINSTEIN Ph.D.**, has received a U. S. Government Grant under the Fulbright Act to lecture during 1961 at the Faculty of Pharmacy and Biochemistry of the University of San Marcos in Lima, Peru. He is presently a pharmaceutical chemist with the Pharmaceutical Research and Development Dept. of Chas. Pfizer and Co., Inc., Brooklyn, N. Y., and a lecturer at the College of Pharmacy of Columbia University. Dr. Reinstein will be teaching physical pharmacy and will collaborate with Dr. Bertha Pareja of University of San Marcos in a joint research project between that institution and the University of Wisconsin.

While in South America last year in his capacity as Commissioner for Latin America of the International Pharmaceutical Students' Federation, Dr. Reinstein visited the pharmacy school at San Marcos as well as those at the National University in Bogota, Colombia and the Central University in Caracas, Venezuela. This will be the second experience in pharmacy abroad for Dr. Reinstein, since he was a trainee in production and research in 1954 with the pharmaceutical firm Dr. Karl Thomae, GmbH, Biberach, Germany.

► **BURNS GEIGER**, director of the hospital department, Roche Laboratories, Nutley 10, New Jersey, spoke on, "Are You Actually in the Hospital Market?" at the Pharmaceutical Manufacturers Association Meeting, February 15, 1961, at the Edgewater Beach Hotel, Chicago, Illinois.

► **THE TEACHERS' SEMINAR OF PHARMACY**, sponsored by the American Foundation for Pharmaceutical Education and the School of Pharmacy at the University of Wisconsin, will be held on the Wisconsin campus July 9-15. The Seminar for teachers of pharmacy is to provide them with the latest information and current concepts of selected subjects within the pharmacy curriculum, and through workshop sessions, develop a syllabus for the students' sequence of instruction in the professional curriculum.

► **VINCENT M. CARACCILO** of Inwood, New York, has received appointment as a pharmacy officer at the U. S. Public Health Service's Indian Hospital, Belcourt, North Dakota. Mr. Caracciolo received his B.S. degree in pharmacy in June 1959 from St. John's University, Jamaica, New York, where he was valedictorian and secretary of the Senior Class. He is a member of Rho Chi, the American Pharmaceutical Association, and the Italian Pharmaceutical Association.

► **HOSPITAL PHARMACISTS** participating in the Pharmacy Congress sponsored by St. Johns University College of Pharmacy on March 17 include Herbert L. Flack, Assistant Director, Jefferson Medical College Hospital, Philadelphia, and Norman Baker, Apothecary-in-Chief, The New York Hospital, N. Y. Mr. Flack will present papers on "A Purchasing Quality Control Program," and will also serve on a panel entitled "The Relationship of Its Service Activities and Professional Practices." Mr. Baker will moderate the afternoon session.

► **HERBERT L. FLACK**, formerly Director of Pharmacy Service at Jefferson Medical College Hospital in Philadelphia, has recently been appointed Assistant Director of the same institution. Mr. Flack is a past-president of the **AMERICAN SOCIETY OF HOSPITAL PHARMACISTS** and has been at Jefferson Medical College Hospital for 14 years.



The Pharmacy of St. Anthony de Padua Hospital in Chicago, Illinois, recently filled its five millionth prescription. Receiving a crude drug apothecary jar to commemorate the occasion is pharmacist Sister Mary Evarista. The jar is presented by Eli Lilly and Company. Howard G. Stephens, Lilly's Chicago Central District Manager, makes the award. Observing the ceremony are Sister Superior Leonada, hospital administrator and C. A. Garibaldi, Lilly representative

Reprint on Hospital Formulary System Available

"The Hospital Formulary System," is the title of a reprint recently made available by the **AMERICAN SOCIETY OF HOSPITAL PHARMACISTS**. It brings together several significant articles on this subject including Guiding Principles of Formulary System—Editorial from **AMERICAN JOURNAL OF HOSPITAL PHARMACY**; Hospital Formulary System—Editorial from *Hospitals*; The Legal Basis of the Hospital Formulary System, by Alanson W. Willcox, including A Legal Opinion on Trade Symbol Implications; Statement of Guiding Principles on the Operation of the Hospital Formulary System; Statement on the Pharmacy and Therapeutics Committee; and Statement of Principles Involved in the Use of Investigational Drugs in Hospitals.

The cost of the reprint in booklet form is as follows:

1 - 9 copies\$0.35 each
10 - 24 copies\$0.30 each
25 or more copies\$0.25 each

Orders may be directed to the **AMERICAN SOCIETY OF HOSPITAL PHARMACISTS**, 2215 Constitution Avenue, N.W., Washington 7, D. C.

Texas Board Clarifies Regulations

At a recent meeting of the Texas State Board of Pharmacy, the following regulation was passed in order to clarify the provisions of Section 17 (d) (3) of Article 4542a of the Texas Statutes:

It shall be deemed a violation of Section 17 (d) (3) of Article 4542a, for any pharmacist or pharmacy licensed by the Texas State Board of Pharmacy who is engaged in the retail operation of a pharmacy to disseminate, personally or acting through agents or employees, by the use of any media of communication, his selling price for any drug or drugs which bear the legend: "Caution: Federal law prohibits dispensing without a prescription," to members of the general public or to practitioners of the healing art, except upon the specific request of a particular member of the general public or practitioner of the healing arts for such information.

1961 ASHP ANNUAL MEETING



Schedule of Events

- Executive Committee—Saturday, April 22, 9:00 A.M.
- Executive Committee—Sunday, April 23, 9:00 A.M.
- Committee on Resolutions—Sunday, April 23, 9:00 A.M.
- House of Delegates—Sunday, April 23, 2:00 P.M.
- Reception for Dr. Svend Aage Schou—Sunday, April 23, 5:30 P.M.
- Committee on Resolutions—Monday, April 24, 9:00 A.M.
- First General Session—Monday, April 24, 1:30 P.M.
- Second Session — Tuesday, April 25, 9:00 A.M.
- Third Session—Tuesday, April 25, 1:30 P.M.
- H.A.K. Whitney Award Reception—Tuesday, April 25, 7:00 P.M.
- H.A.K. Whitney Award Lecture Award Dinner—Tuesday, April 25, 8:00 P.M.
- Committee on Resolutions — Wednesday, April 26, 9:00 A.M.
- ASHP Breakfast — Thursday, April 27, 8:00 A.M.
- Fourth (Final) Session—Thursday, April 27, 9:30 A.M.

All meetings will be held at Hotel Sherman, Chicago.

News

► PUBLIC HEALTH SERVICE pharmacists from fifty states will meet at the U.S. Public Health Service Hospital, Lexington, Kentucky, on April 5-8, 1961, with the Clinical Society of the U.S. Public Health Service. They will present professional lectures, papers, exhibits, and demonstrations to the pharmacy and general sessions and study the special (narcotic) hospital operation. Henry W. Beard, senior pharmacist at the P.H.S. Hospital in Lexington, is chairman of the pharmacy section.

► SMITH, KLINE AND FRENCH LABORATORIES has announced a revision of its distribution policy, effective February 16, 1961. The new policy increases the nation-wide availability of certain products in bulk packages.

In the past, bulk packages (formerly called hospital packages) were available only to non-profit hospitals on a drop-shipment or direct basis. Under the new policy, they will be stocked by wholesalers for sale to all hospitals. Wholesalers are also authorized to accept from hospitals returns of unopened bulk packages. Hospitals are therefore urged to purchase all SKF products from local wholesalers.

Frazier Cheston, director of distribution, stated that this change in policy is the result of a comprehensive six-month study of the firm's distribution program.

The prize-winning display in the Hospital and Clinics Division of the 1960 National Pharmacy Week Display Contest sponsored by the A.Ph.A. Mr. Joseph H. Beckerman, chief pharmacist at the University of California Hospital, Los Angeles, will receive a plaque at the Chicago Convention



SELECTED PHARMACEUTICAL ABSTRACTS

and summaries of other articles interesting to hospital pharmacists

edited by NORMAN HO

PYROGEN TESTING

Some Problems of Pyrogen Testing, Braun, H. and Klem, V., Bull. Parenteral Drug Assoc. 14:9 (Sept.-Oct.) 1960. (Division of Pharmacology, Bureau of Biological and Physical Sciences, Food and Drug Administration, U.S. Department of Health, Education, and Welfare, Washington 25, D. C.)

Some problems of pyrogen testing in which the U.S.P. monograph has no recommendations are discussed: (1) the effects of restraint vs. non-restraint of rabbits, dilution of solutions on the response to pyrogens, and rate of injection on pyrogenicity and preservatives, (2) the significance of temperature fall instead of rise, and (3) intramuscular vs. intravenous route of administration, and (4) effect of preservatives.

Maximal response of the rabbit to the injection of pyrogens results when the degree of restraint and handling is at a minimum. Restraint can cause hypothermia and change the sensitivity of the rabbits to their threshold for pyrogens. Animals which have been hypothermic have an abnormal response to pyrogen both during the hypothermia and after they have again attained their normal temperature. Those animals that show persistent hypothermic action should be discarded. Hypothermia due to restraint has been attributed to decreased heat production, exposure of more body surface, and possibly fear. With the use of restrictive stocks or stanchions and thermocouples with direct reading or recording thermograph, the rise in rectal temperature of the rabbit associated with least handling and excitement disappears as the animals become conditioned to the restraints.

Although it has been reported that there is a graded response in temperature to increasing doses of intravenous injection of the pyrogenic substance, it was found that diluted concentrations of a stock pyrogen *Pseudomonas aeruginosa*, 2 mcg./ml., did not show significant decreased pyrogen reaction. Furthermore the increases in rectal temperature of rabbits subjected to various rates of injection of a pyrogenic solution, that is 1 ml. per 1, 2, 4 and 8 seconds, did not differ significantly.

Certain drug components of parenteral solutions produce hypothermia or interfere with the febrile response of pyrogens not attributed to emotional or restrictive hypothermia. Antipyretics, chlorpromazine and some related phenothiazine derivatives, some hypnotics, anesthetics, and strophanthidin are included among the compounds.

Since some preparations suspected to be pyrogenic, such as the androgens, do not lend themselves to the official U.S.P. method, it is necessary to administer them intramuscularly. The rises in temperature upon intramuscular injection are lower than those obtained by the intravenous route, but there is a graded response with increasing amounts of pyrogenic material.

The effect of preservatives on test animals can cause severe reactions including death. The severity of reaction of benzyl alcohol from 0.5 to 2 percent and 1 to 2 percent phenol depended not only on the concentration but also on the rate of injection.

NORMAN HO

O-PHENYLPHENOL AS A PRESERVATIVE

o-Phenylphenol—A Preservative Worthy of Reconsideration, Wiese, E. E., Moebius, R. E., Am. Perfumer Aromat. 76:23 (Jan.) 1961.

Although o-phenylphenol has been used extensively for many years in a wide range of industrial disinfectants, its use in topical preparations has been overlooked. In the past, the use of o-phenylphenol was limited to those applications in which odor, taste, and color stability were not of major importance. Purified grades of this compound have been developed recently overcoming these limitations. o-Phenylphenol has an extremely low order of acute and chronic oral toxicity. As a result of skin testing of Dowicide, 1 in a 0.5% concentration in a vanishing cream base, it did not exert primary irritating fatiguing, allergenic or photosensitizing action. Laboratory tests show that o-phenylphenol is effective in killing gram-negative bacteria in dilutions of 1:2000, most gram-positive bacteria at 1:1700, and twelve dif-

ferent fungi were killed in a range of concentrations of 0.015 to 0.005%. It was suggested that a range of concentrations of 0.05 to 0.25% by weight be considered for microbiological control.

FRANZ W. GEISZ

COLOR ADDITIVES, REGULATIONS AFFECTING

Color Additives for Cosmetics and Drugs, Goulden, H. D., Drug and Cosmetic Industry 87:756 (Dec.) 1960.

The law "Color Additives Amendments of 1960" was passed by Congress on July 12, 1960 amending the Food, Drug and Cosmetic Act concerning the safe use of colors in foods, drugs and cosmetics. This law is transitional and will be in effect until superceded by permanent regulations. Colors are classified into eight categories or lists according to their permitted use. Some categories of dyes for ingested drugs stipulate maximum daily dose. These lists are admittedly incomplete; however, until more pharmacological testing is carried out, the author suggests using an FDC color or lake whenever possible if a dye is required that has not yet been placed on one of the lists.

FRANZ W. GEISZ

COMPLEX FORMATION BY SACCHARIN

Complexing Tendencies of Saccharin in Aqueous Solutions, Marvel, J. R. and Lemberger, A. P., J. Am. Pharm. Assoc., Sci. Ed. 49:417 (July) 1960 (The University of Wisconsin, School of Pharmacy, Madison, Wis.)

The possible interactions between saccharin and various typical complexing agents have been investigated. The solubility method was employed as the analytical procedure, because this method had been reported to be particularly applicable for detecting small complexing tendencies. Results showed that a 1:1 complex was formed between saccharin and theophylline. Saccharin also formed water-soluble complexes with caffeine, various amides, and phenols. No interactions were observed between saccharin and N-methylpyrrolidone, gamma butyrolactone and polyethylene glycol 4000.

LAWRENCE J. RASERO

DYNAMICS OF DISINFECTION

Some Aspects of the Dynamics of Disinfection, Jacobs, S. E., D. Sc., Ph.D., A.R.C.S., British Pharmaceutical Conference Symposium J. Pharm. Pharmacol. (Sept.) 1960. (Imperial College of Science and Technology, London, England.)

The course of destruction of populations of bacteria by disinfectants can be quantitatively followed by appropriate sampling, and can be related to time to give characteristic disinfectant curves. A practical application involves determining the times for apparently complete destruction. Many factors affect the rate of action: concentration and type of agent, type of organism, temperature, pH, concentration and kind of cations present, particulate and especially organic matter. Organic matter may interfere by reacting with the agent, displacing agent from cell surface, or by forming a protective film; or serve as a source of nutrients enabling the organism to maintain structure and repair damage. This would be possible only at a low concentration of the agent where some of cells could still metabolize.

At the threshold concentration, sterilization takes an infinitely long time. As time versus concentration is plotted, the graph should steepen sharply as the threshold concentration is approached. In addition to this, however, two other observations appeared. At a concentration

slightly above the expected threshold level, bacterial multiplication began to occur after destruction had already begun. As the concentration used was reduced further, the virtual sterilization time actually decreased somewhat. This anomaly is resolved if it is possible for some cells to survive at a concentration at which all other cells are killed. At the same time, rapid destruction of sensitive cells is also occurring. It is then conceivable multiplication can be occurring even when total bacterial count is decreasing. Certain other cells have a correspondingly remarkable sensitivity under certain conditions. Two concepts explain these deductions: the ability of a cell to withstand damage varies according to its stage in the division cycle; after fission, in the presence of an agent, the daughter-cells are more susceptible than the original. Because of such a complexity of factors and conditions it may be impossible to obtain an accurate determination of the true threshold concentration of a disinfection agent.

CHARLES J. HARTLEIB

PHENOLATED IODINE

A Study of Phenolated Iodine Solution N.F., Levy, Gerhard, Juszkiewicz-Donsbach, J. S., Guntow, R. H., Drug Standards 28:129 (Sept.-Oct.) 1960. (University of Buffalo, School of Pharmacy, Buffalo 14, N. Y.)

A modified method for the preparation of Phenolated Iodine Solution N.F. has been studied. The rate of iodination of phenols is pH sensitive and increases with hydroxyl ion concentration. It was found that the addition of 0.03% sodium bicarbonate and 0.4% sodium biphosphate raised the reaction rate such that the solution can be prepared more quickly and conveniently without recourse to the application of heat or sunlight. Strong iodine solution and liquefied phenol were placed in a suitable flask, the sodium bicarbonate added and the flask agitated until the characteristic iodine color had disappeared and the mixture had assumed a cloudy white appearance. Glycerin was then added, followed by water and sodium biphosphate, and the resulting clear solution was mixed well.

The resulting solution was also tested for antibacterial activity and found to be equivalent to the official preparation in effectiveness.

PAUL J. PIERPAOLI

STABILITY OF STANDARD SOLUTIONS

The Stability of 1/200 N Sodium Thiosulphate and 1/200 N Alkaline Potassium Ferricyanide, Nielsen, A. B., Dansk Tidsskr. Farm. 34:61 (Apr.) 1960. (Pharmacy of the Municipal Hospital of Aarhus, Denmark.)

Initially the author deals with the considerations to be made before deciding to carry a standard solution as a stock-article.

The aim of this work is to elucidate the justifiability of keeping 1/200 N thiosulphate and 1/200 N alkaline potassium ferricyanide for any shorter or longer period. These two standard solutions are generally used in Scandinavia for determination of the contents of glucose in the blood according to a method elaborated by Hagedorn. The principle of the method is briefly described, and the literature concerning the stability of the solutions is discussed.

1/200 N thiosulphate shows good stability especially when kept protected against light in the Swedish CSB bottle.

1/200 N alkaline potassium ferricyanide is a solution of poor stability which among other things will be decomposed by the action of reducing substances from rubber stoppers, from light and from high temperatures. The choice of bottle type is very important.

AUTHOR'S SUMMARY

ANALYSIS OF NAPHAZOLINE

A Rapid Method for the Analysis of Naphazoline in Control and Stability Samples, Mattson, L. N., Gaebeler, R. N., Drug Standards 28:77 (May-June) 1960. (Chemical Laboratories, Scientific Associates, Inc., St. Louis, Mo.)

Naphazoline may be determined rapidly by the acid dye method of colorimetric analysis. The method is of value where ultraviolet methods are not indicative of the extent of hydrolysis. Much time is saved over chromatographic procedures if it is not desired to determine degradation products. These do not interfere with the analysis. The method is more rapid than the N.F. method and more specific than the spectrophotometric method

since the intact molecule is utilized. Stability of preparations is dependent on pH.

CHARLES J. HARTLEIB

DEMINERALIZED WATER

Demineralized Water. 4. Preliminary Report on the Effect of Pyrogen on the Blood Coagulation Factors, Rasmussen, Poul, Dansk Tidsskr. Farm. 34:41 (Mar.) 1960. (Biochemical Department, the State Serum Institute, Copenhagen.)

It has been observed that water containing pyrogen influences the blood coagulation factor B (Christmas factor - Koller IX). Within a few hours pyrogen reduces the amount of factor B (primary effect) and thereafter causes an increase of this factor to well over the normal value (secondary effect).

Even "pyrogen-free" water—water which is devoid of pyrogen according to the Ph. Dan. 1948—significantly influences the blood coagulation factor B as regards the secondary effect, but no primary effect is observed.

This observation might explain some of the problems arising when infusions containing pyrogen are given, which have so far not been solved.

AUTHOR'S SUMMARY

CURRENT LITERATURE

... also calling your attention to the following articles appearing in recent hospital and pharmaceutical journals

ADMINISTRATION

—Policy

Anon.: 8 Ways Hospital Pharmacists Provide Drugs 24 Hours Daily, *Am. Profess. Pharmacist* 27:34 (Jan.) 1961.

DETAIL MEN

Teplitzky, Benjamin: What Hospital Pharmacists Think of Detail Men, *Am. Profess. Pharmacist* 27:29 (Feb.) 1961.

ETHICS

Vance, Joe: Must We Legislate Ethics? *South. Hosp.* 29:56 (Feb.) 1961.

LIBRARY AND REFERENCE

Seifert, Vernon D.: A Case for A 'Professional' Hospital Library, *Hospitals* 35:44 (Jan. 16) 1961.

OUTPATIENT DISPENSING

Moravec, Daniel: Outpatient Dispensing, *Hosp. Management* 91:73 (Mar.) 1961.

PHARMACOLOGY

Gaunt, Robert, Chert, J. J., and Renzi, A. A.: Endocrine Pharmacology, *Science* 133:613 (Mar. 3) 1961.

PHARMACY AND THERAPEUTICS COMMITTEE

(Includes Formularies)

Symposium: What's In A Name? (Series of papers presented at a Joint Meeting of A.Ph.A. Sections, 1960 Convention); *J. Am. Pharm. Assoc.* NS1:92 (Feb.) 1961.

Vance, Joe: The A.M.A. In Hospital Formularies, *South. Hosp.* 29:50 (Jan.) 1961.

POISON CONTROL

Christian, Joseph R.: Antidote Supplies for the Emergency Room, 91:70 (Feb.) 1961.

SAFETY PRACTICES AND PROCEDURES

Anderson, R. David: How the Pharmacist Can Promote Safer Drug Handling, *Hospitals* 35:63 (Jan.) 1961.

SMALL HOSPITALS

Bowles, G. C. Jr.: Retail Pharmacist Finds Services to Hospital Rewarding Experience, *Modern Hosp.* 95:120 (Nov.) 1960.

RADIOPHARMACEUTICALS

Christian, John E.: Radioisotopes in the Pharmaceutical Sciences and Industry, *J. Pharm. Sci.* 50:1 (Jan.) 1961.

Hellman, John S.: An Administrative Challenge. Nuclear Medicine, *Hosp. Progress* 42:51 (Feb.) 1961.

DRUG EVALUATIONS

by the Council on Drugs of the American Medical Association

► DRUG EVALUATIONS as published by the Council on Drugs of the American Medical Association have been reprinted in the AMERICAN JOURNAL OF HOSPITAL PHARMACY regularly. In accordance with an editorial in the December 17 (1960) issue of the *Journal of the American Medical Association* 174:2066, the column formerly known as "New and Nonofficial Drugs" has been replaced by a new column under the name "New Drugs and Developments in Therapeutics." In this, a digest of monographs and drug evaluations will appear.

The monographs will continue to be made available and will be cumulated to appear in the Council's annual publication, *New and Nonofficial Drugs*. For the information of hospital pharmacists, reports made available by the A.M.A.'s Council on Drugs will continue to be published in this column.

The Index included in the February issue of THIS JOURNAL contained reference to those drugs published in the *Journal of the American Medical Association* between October 24, 1959 and December 17, 1960. These monographs were reprinted in THIS JOURNAL between February 1960 and January 1961. All appear in *New and Nonofficial Drugs 1961*, which is now available from either your local book store or from the publishers, J. B. Lippincott Company, Philadelphia, Pa. This makes up the annual compilation of available information on drugs, including their therapeutic, prophylactic and diagnostic status, as evaluated by the Council on Drugs of the American Medical Association.

For the convenience of readers of THIS JOURNAL, a listing of the monographs added to N.N.D. 1961 as well as the monographs omitted from N.N.D. 1961 are listed below.

FERROUS FUMARATE
FIBRINOLYSIN (Human)
FLUOROMETHOLONE
FURALTADONE
HEPARIN POTASSIUM
HYDROCHLOROTHIAZIDE, U.S.P.
HYDROXYZINE PAMOATE
IMIPRAMINE HYDROCHLORIDE
ISOXSUPRINE HYDROCHLORIDE
KANAMYCIN SULFATE, U.S.P.
MEDROXYPROGESTERONE ACETATE
METHDILAZINE HYDROCHLORIDE
METHOCARBAMOL
METHOHEXITAL SODIUM
METHOXYPRIMAZINE MALEATE
METHSUXIMIDE
METHYLPREDNISOLONE ACETATE
METHYLPREDNISOLONE SODIUM SUCCINATE
NIALAMIDE
OXANAMIDE
OXYMORPHONE HYDROCHLORIDE
OXYPHENCYCLIMINE HYDROCHLORIDE
PHENFORMIN HYDROCHLORIDE
PIPAMAZINE
PIPETHANATE HYDROCHLORIDE
PLASMA PROTEIN FRACTION (Human)
PROTOKYLOL HYDROCHLORIDE
PROTOVERATRINE A
STYRAMATE
SULFADIMETHOXINE
SULFINPYRAZONE
TALBUTAL
THIORIDAZINE HYDROCHLORIDE
THIO-TEPA
TRICLOBISONIUM CHLORIDE
TRIFLUOPERAZINE HYDROCHLORIDE
TRIMETHIDIUM METHOSULFATE
TRIMETHOBENZAMIDE HYDROCHLORIDE
TRIPROLIDINE HYDROCHLORIDE

Monographs Omitted From N.N.D. 1961

The following monographs appearing in the previous edition of N.N.D. have been omitted, for these drugs are considered well known because of their inclusion in N.N.D., U.S.P., or N.F. for a cumulative period of 20 years:

CHORIONIC GONADOTROPIN
GITALIN (Amorphous)
MENADIONE, U. S. P.
PYRIDOXINE HYDROCHLORIDE, U.S.P.
HUMAN SCARLET FEVER IMMUNE SERUM, N.F.
PURIFIED PROTEIN DERIVATIVE OF TUBERCULIN, U.S.P.

The following monographs for previously described drugs are omitted because they are no longer commercially available in the United States:

CARBOMYCIN
ERYTHROMYCIN PROPIONATE
HYDROXYPROGESTERONE ACETATE
IRON-DEXTRAN COMPLEX
PYRIVINUM CHLORIDE
THIAZOLSULFONE

Monographs Added To N.N.D. 1961

The following monographs have been added for drugs evaluated since the previous edition of N.N.D.:

AM BENONIUM CHLORIDE
BIPERIDEN HYDROCHLORIDE
BUNAMIODYL SODIUM
CHLORPHENOXAMINE HYDROCHLORIDE
CHLORPROPAMIDE
DEANOL ACETAMIDO BENZOATE
DEMECARIUM BROMIDE
DEXAMETHASONE
DEXBROMPHENIRAMINE MALEATE
DEXCHLORPHENIRAMINE MALEATE
DICHLORPHENAMIDE, U.S.P.
DIETHYLPROPION HYDROCHLORIDE
ECHNOTHIOPHATE IODIDE
ERYTHROMYCIN PROPIONATE LAURYL SULFATE
ETHOHEPTAZINE CITRATE

New Drugs and Developments in Therapeutics

Withdrawal of Iron-Dextran Complex (Imferon)

► **IRON-DEXTRAN COMPLEX**, a preparation of iron for administration by intramuscular injection, has been commercially available in the United States since 1957. Despite extensive use, serious side-effects have been rare; untoward reactions have been limited chiefly to local pain and staining of skin at the site of injection; systemic reactions have been infrequent. However, several papers have appeared recently in which repeated intramuscular injection of large doses of iron-dextran complex were reported to produce sarcomas in mice and rats. These results received extensive discussion in the British medical press, and, in March, 1960, the British manufacturer suspended advertising of the product. In April, 1960, the distributor of iron-dextran complex in the United States, Lakeside Laboratories, Inc., having been presented with the alternatives of withdrawing the product from the market or of defending its continued sale in a formal hearing by the Food and Drug Administration, chose to withdraw the drug without a hearing.

The Council has been informed that the product was withdrawn under that provision of the Federal Food, Drug, and Cosmetic Act according to which marketing of a drug is based on evaluation of relative benefits of a product in comparison with its relative hazard; in this provision of the Act there is no deterrent to the marketing of a drug merely because it may be carcinogenic under some circumstances. Thus, the impression that the Delaney clause to the Food Additive Amendment governed the withdrawal of iron-dextran complex is incorrect. The action was apparently based on the opinion of the Food and Drug Administration that the drug was labeled in such a way as to promote its use in many situations that do not justify the parenteral administration of iron because of the possible risk involved. The Council has been informed that the distributor has been invited to prepare, with advice of medical experts, appropriate labeling preliminary to reconsideration of marketing.

Nevertheless, the Council thinks that the following facts should be emphasized:

First, although iron-dextran complex has been widely used over a period of 6 years, the evidence that it has caused neoplasm in man is limited to a single report of a questionable sarcoma which developed in the deltoid muscle at a site where the drug is thought to have been injected about three years previously; there is serious doubt that the initial

diagnosis of sarcoma in this report was correct. Although the drug has been shown to induce sarcomas in mice and rats, attempts to produce similar lesions in rabbits and guinea pigs have failed. In evaluating the significance of the changes in rats, it should be remembered that this species is especially susceptible to development of local sarcomas after intramuscular injection of a variety of substances not causing malignancies in other animals.

Second, the withdrawal of iron-dextran complex deprives the physician of a useful drug, since, in some situations, parenteral administration of iron is preferable to oral administration. To the Council, the use of iron-dextran complex does not appear to be attended by any greater hazard than do the administration of the injectable forms of iron and the transfusions which physicians are now obliged to use as substitutes. Other presently available iron preparations for parenteral use must be given intravenously; intravenous administration of iron has been accompanied by serious systemic reactions, characterized by flushing, hypotension, syncope, vomiting, diarrhea, fever, and encephalopathy. The dangers of the other alternative—transfusions of whole blood—are well known and include hepatitis and transfusion reactions.

However, it should be emphasized that the Council does not advocate indiscriminate parenteral administration of iron. As stated in the Council's original statement on iron-dextran complex (*JAMA* 166:1482 [March 22] 1958; *New and Nonofficial Drugs*, 1960, pp. 523-524), "Iron-dextran complex is indicated solely for the treatment of iron deficiency anemia in those situations in which parenteral therapy is deemed preferable to oral medication." Since oral therapy is entirely satisfactory in the great majority of cases of iron-deficiency anemia, injection of iron has only a limited field of usefulness; furthermore, injectable forms of iron should be used only after the diagnosis of iron deficiency anemia is established. A detailed exposition of those conditions in which the Council feels that parenteral administration of iron is justified is presented in the cited monograph.

The Council feels strongly that iron-dextran complex should again be made available to the physician for use in those patients in whom iron-deficiency anemia is present, its cause has been determined and, if possible, corrected, and in whom oral administration of iron is unsatisfactory or impossible.

J. Am. Med. Assoc. 175:388 (Feb. 4) 1961.

POSITIONS

in hospital pharmacy

The Personnel Placement Service is operated without charge for the benefit of hospitals and pharmacist members of the American Pharmaceutical Association and the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS. The ultimate purpose is the improvement of pharmaceutical services in hospitals, by more adequately fulfilling hospital pharmacy personnel needs and by locating positions which provide challenging opportunities for pharmacists who have indicated an interest in a hospital career.

By participating in the service, the hospital indicates a desire to achieve a pharmaceutical service which meets the Minimum Standard for Pharmacies in Hospitals. A description of the position should be submitted to the Division of Hospital Pharmacy on the forms provided. The hospital will receive applications directly from the applicant. The hospital agrees to reply to each application received and to notify the Division of Hospital Pharmacy when the position is filled.

The pharmacist, by participating, agrees to submit a Personnel Placement Service Information Form to the Division of Hospital Pharmacy. The applicant will then be notified of openings listed with the Service as they become available and can negotiate directly with the hospital if he is interested. It is agreed that the Division of Hospital Pharmacy will be notified as soon as a position is accepted.

A listing of positions open and wanted will be made regularly in the AMERICAN JOURNAL OF HOSPITAL PHARMACY without charge. Neither the name of the hospital offering the position nor the name of the applicant will be listed, except by code. All inquiries should be directed as shown below, including the code number.

Address all inquiries to
Division of Hospital Pharmacy
2215 Constitution Avenue, N. W.
Washington 7, D.C.

positions open

STAFF PHARMACIST—400 bed general hospital. New hospital scheduled to open Summer 1961. Duties include compounding and dispensing drugs, medicines and pharmaceutical supplies. Supervising prepackaging program, small out-patient clinic. B. S. degree and registration in Ohio required. Forty hour week, vacation. PO-260

CHIEF PHARMACIST—450 bed hospital in New Jersey. Duties include compounding and dispensing medicines and preparations, preparing and sterilizing injectible medications manufactured in hospital and other related duties. Male or female. B. S. required. Forty hour week, liberal personnel policies. PO-259

CHIEF PHARMACIST—837 bed general hospital. Duties include supervision, purchasing, etc. Will also serve as secretary of therapeutics committee. Must have B. S. and registration in Connecticut. Forty hour week, three weeks vacations and other personnel policies. PO-258

ASST. CHIEF PHARMACIST—272 bed general hospital. Opportunity to help organize a new hospital pharmacy just in the process of opening. Duties include compounding and dispensing prescriptions, providing information to nurses and physicians, some teaching, and will be in charge of dept. in chief pharmacist's absence. Must be registered or eligible for registration in Kentucky. Liberal employee benefits. PO-257

STAFF PHARMACIST—700 bed general hospital located in California. Duties include filling prescriptions, ward orders and manufacturing. Must be registered in California. Forty hour week, two weeks' vacation, employee benefits. PO-256

STAFF PHARMACIST—700 bed University teaching hospital. Duties include inpatient and outpatient dispensing. B. S. required. Must be registered or eligible for registration in Wisconsin. Forty hour week, vacation and insurance programs. PO-255

ASST. CHIEF PHARMACIST—317 bed general hospital located in Delaware. Duties include assisting chief pharmacist in carrying out procedures and policies. Male preferred with internship, preferably M. S. degree. Forty hour week, vacation, liberal personnel policies. PO-254

STAFF AND ASST. CHIEF PHARMACISTS—600 bed general hospital located in suburb of Chicago. Filling patient prescriptions. Forty hour week. Excellent personnel policies. PO-252

REGISTERED PHARMACIST—154 bed general hospital primarily for care of Samoan people. Complete charge. Free medical and hospital care. Ten weeks' paid leave at termination of two year contract. Single person preferred. Send resume, experience, education, availability and salary requirements to: Personnel Officer, Government of American Samoa, Pago Pago, American Samoa.

STAFF OR ASST. CHIEF PHARMACIST—300 bed general hospital. Duties include compounding, dispensing, assisting in purchasing of supplies, preparing reports, maintaining records, furnishing information on medications to physicians and nurses, and assisting with special duties as assigned by chief pharmacist. Must have B. S. and be eligible for registration in Georgia. Liberal employee benefits. PO-251

STAFF PHARMACIST—237 bed general hospital. Duties include filling patient drug orders, outpatient prescriptions and assisting chief pharmacist. B. S. degree and registration in Iowa required. Forty hour week, vacation, sick leave. PO-250

STAFF PHARMACIST—525 bed general hospital located in Ohio. Duties include filling prescriptions for patients, floor stock and clinic patients. Must be registered in Ohio. Forty hour week, vacation and personnel policies. PO-249

CHIEF PHARMACIST—60 bed general short-term hospital. Pharmacist will be completely responsible for the operation of the pharmacy dept., including purchasing drugs and supplies and the preparation of monthly reports. Will also be responsible for meeting with the pharmacy and therapeutics committee making suggestions and recommendations for pharmacy procedures. Must be registered in California. Liberal personnel policy. PO-243

STAFF PHARMACIST—240 bed general hospital expanding to 300 beds. Male or female. Must be registered in Tennessee. Forty hour week, vacation and liberal benefits. PO-247

STAFF PHARMACIST—700 bed general hospital. Duties include dispensing drugs from the central and clinic pharmacies. Registration in Georgia required. Male or female. Liberal personnel policies. PO-245

STAFF PHARMACIST—275 bed private hospital in Chicago. Applicant will compound and dispense drugs and medicines. Must be licensed in Illinois. Forty hour week, vacation and other liberal benefits. PO-243

STAFF PHARMACIST—520 bed general private hospital. Duties include compounding and dispensing medicines and preparations according to prescriptions. Female preferred. Must be registered or eligible for registration in Washington State. Forty hour week, vacation and other liberal benefits. PO-242

CHIEF PHARMACIST—380 bed general hospital located in North Carolina. Applicant will organize department in new institution which will open in February or March, 1961. Hospital pharmacy internship required. Vacation, retirement and sick leave. PO-239

STAFF PHARMACIST—350 bed general hospital located in Florida. Dispensing patient drug orders and related duties. Must be eligible for registration in Florida. Forty hour week, vacation, holidays, sick days, group insurance and retirement. PO-238

ASST. CHIEF PHARMACIST—650 bed general hospital located in Nebraska. Duties include refilling patient orders, floor supplies for nursing stations and compounding supplies. Forty hour week, vacation. PO-236

STAFF PHARMACIST—350 bed general hospital. Applicant will assume some supervisory responsibility. B. S. required. Must be registered or eligible for licensure in Ohio. Forty hour week, vacation, sick leave, holidays and group hospitalization. PO-235

STAFF PHARMACIST—220 short-term general hospital located in Indiana. Duties include compounding and filling prescriptions, pricing charge slips, taking inventory of narcotics and alcohols, ordering drugs, recording statistics, and supplying information on drug usage. Forty hour week, vacation, sick leave and employee health program. PO-232

CHIEF PHARMACIST—120 bed general hospital located in Kansas. Pharmacist will organize pharmacy department and assist in teaching pharmacology to student nurses. Must be registered or eligible for licensure. Forty-four week, vacation, liberal benefits. PO-230

ASST. CHIEF PHARMACIST—400 bed general hospital. Must be eligible for licensure in Virginia. Forty-four hour week, vacation, liberal benefits. PO-227

STAFF PHARMACIST—550 bed teaching hospital located in Virginia. No experience necessary. Female preferred. Forty hour week, vacation, liberal benefits. PO-226

CHIEF PHARMACIST—General hospital located in West Virginia. Pharmacist will be under direct supervision of the administrator, filling prescriptions and allied duties; planning; organizing; and directing pharmacy and central sterile supply in accordance with established policies. B. S. required. Forty hour week, liberal benefits. PO-225

CHIEF PHARMACIST—100 bed general hospital located in Ohio. Applicant must have organizational ability and will assume administrative responsibilities of the dept. Must be registered. PO-224

CHIEF PHARMACIST—Psychiatric hospital located in Ohio. Must be registered in Ohio. Forty hour week, vacation and retirement benefits. PO-221

STAFF PHARMACIST—400 bed general hospital located in Texas. Duties include dispensing, etc. Applicant must have B. S. and be eligible for registration in Texas. Forty hour week, two weeks vacation. Write: Pharmacy Department, Harris Hospital, Fort Worth, Texas. PO-219

ASST. CHIEF PHARMACIST—200 bed general hospital located in Connecticut. Duties include filling of medication orders, preparing stock drugs and filling inpatient and outpatient prescriptions. Forty hour week, two weeks vacation and sick leave. PO-218

ASST. CHIEF PHARMACIST—220 bed general hospital. Will be in charge of pharmacy in chief pharmacist's absence. Qualifications: Female, B. S., experience in pharmacy administration, licensed in Pennsylvania. Forty hour week, vacation, progressive personnel policy. PO-209.

ASST. CHIEF PHARMACIST—500 bed general hospital located in Iowa. Will assist chief pharmacist and will be responsible for the operation of the pharmacy dept. in the absence of the chief pharmacist. Forty hour week, vacation, sick leave and holidays. PO-205

ASST. CHIEF PHARMACIST—238 bed general hospital located in Michigan. Duties include dispensing, controlling pharmacy divisions on nursing units, and assuming responsibility of the pharmacy in absence of chief pharmacist. Forty hour week, vacation, holidays and sick leave. PO-204

ASST. CHIEF PHARMACIST—204 bed hospital. Duties include dispensing, receiving, and labeling drugs, etc.; furnishing information to physicians and nurses; teaching student nurses; and being responsible as an assistant department head in administrative and other related duties. Forty hour week, vacation, insurance, and sick leave. Must be eligible for registration in Illinois. PO-203

CHIEF PHARMACIST—104 bed general hospital. Direct pharmacy with the help of full-time registered nurses and assist in the purchase of medical surgical supplies. Forty hour week, vacation and sick leave. Located in a University town in Illinois. PO-202

STAFF PHARMACIST—790 bed hospital. Duties include handling and filling of inpatient and outpatient departmental orders, outpatient prescriptions and bulk manufacturing. Must be registered or eligible for registration in Ohio. Male preferred. Forty hour week, vacation, holidays and pension plan. PO-194

ASST. CHIEF PHARMACIST—225 bed general hospital in Hawaii. Assist chief pharmacist, charge of dept. in chief pharmacist's absence, and supervisory responsibility. Must be eligible for licensure in Hawaii. Forty hour week, vacation, holidays, annual sick leave, insurance and retirement plans. PO-191

CHIEF PHARMACIST—2300 bed mental hospital. Pharmacist will have complete charge of pharmacy, drug orders, stocking, dispensing, compounding necessary records, and other pharmacy duties. Must be licensed in Ohio. Forty hour week, vacation, holidays, insurance, retirement plan, and sick leave benefits. PO-189

STAFF PHARMACIST—400 bed general hospital located in Michigan. Excellent opportunity in an expanding pharmacy program. Liberal benefits. PO-185

CHIEF PHARMACIST—264 bed general hospital located in Texas. Plans and directs pharmacy policies, compounds and dispenses medicines, purchases supplies and materials, maintains records, and prepares periodical reports. Must be eligible for or have M. S. Degree. Forty hour week, vacation, retirement, sick leave and insurance plans. PO-177

STAFF PHARMACIST—200 bed general hospital. Duties include compounding, dispensing, and manufacturing. Applicant must have B. S. in Pharmacy and be registered in Connecticut. Recent graduate acceptable. Forty-four hour week, vacation, pension plan and hospitalization. PO-168

STAFF PHARMACIST—100 bed general hospital located in Texas. Assume personal responsibility for accurate filling of prescriptions and supplies, assist in inspecting drugs in nursing stations, replace stock taken from night emergency container, inspect and refill ophthalmic solution trays from operating room, emergency room, and central supply. Female preferred. Must be registered or eligible for registration in Texas. Forty hour week, vacation, holidays and sick leave. PO-164

ASST. CHIEF PHARMACIST—280 bed general hospital. Duties including filling prescriptions and medication orders from various units, supervise pharmacy clerks, assume administrative responsibility when chief pharmacist is absent. Forty-four hour week, sick leave and holidays. Must be registered in Illinois. PO-161

STAFF PHARMACIST—Unique, new 400 bed general private hospital where pharmacists join the doctor-nurse team by working in a dispensing unit location on each 100 bed nursing unit or in the central pharmacy. The dispensing unit personnel have responsibility for providing drugs, oxygen, dressing trays, I. V. solutions and similar items. A total of sixteen staff pharmacists is required to staff the hospital. Applicants must be eligible for registration in California. Excellent opportunity; generous benefits. PO-148

STAFF OR ASST. CHIEF PHARMACIST—150 bed general hospital located in New Mexico. Generous benefits. PO-134

STAFF PHARMACIST—500 bed general hospital located in Oklahoma. B. S. required. Forty hour week. PO-95

ASST. CHIEF PHARMACIST—237 bed general hospital in West Virginia. Female desired. Forty-four hour week, vacation. PO-77

positions wanted

STAFF PHARMACIST—Male, single. B. S. obtained in 1960 at Texas Southern University. Will locate anywhere. Registered in Louisiana and in the process of being registered in Oklahoma. PW-306

CHIEF PHARMACIST—Male, married. Obtained B. S. in 1952. Served hospital pharmacy internship. Five years' hospital pharmacy experience. Interested in teaching. Will locate anywhere. Registered in Nebraska, Iowa, New Mexico and South Dakota. PW-305

CHIEF PHARMACIST—Male, married. B. S. obtained in 1957 at University of Cincinnati. Four years' hospital pharmacy experience. Prefers to locate in the Midwest. Registered in Kentucky and will soon be registered in Colorado. PW-304

CHIEF PHARMACIST—Male, married. Will obtain M. S. Degree in June of 1961. Serving hospital pharmacy internship. Hospital pharmacy experience. Will locate anywhere. PW-303

STAFF PHARMACIST—Male, married. Obtained B. S. in 1960. Hospital pharmacy experience. Prefers to locate in the West. Registered in Texas. PW-302

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. Obtained B.S. in Organic Chemistry in 1941 and B. S. in Pharmacy in 1953. Five years' hospital pharmacy experience. Prefers to locate in Michigan or Colorado. Registered in Michigan. PW-301

CHIEF PHARMACIST—Male, married. B. S. obtained in 1955 and M. S. in 1957 at University of Michigan. Served hospital pharmacy internship. Hospital pharmacy experience. Will locate anywhere. Registered in Michigan and Kentucky. PW-300

STAFF PHARMACIST—Male, married. Obtained B. S. in 1959. Will obtain M. S. in 1961 at University of Florida. Two years' hospital pharmacy experience. Serving hospital pharmacy internship. Prefers to locate in the West, North or East. Registered in Florida. PW-299

STAFF PHARMACIST—Male, married. B. S. obtained at Texas Southern University, Houston, in 1960. Will locate anywhere. Registered in Texas. PW-298

ASST. CHIEF OR CHIEF PHARMACIST—Female, single. B. S. obtained at the Ohio State University College of Pharmacy in 1954. Five years' hospital pharmacy experience. Prefers to locate in the Midwest or East. Registered in Illinois and Ohio. PW-297

STAFF OR ASST. CHIEF PHARMACIST—Male, married. B. S. obtained in 1952 at Idaho State College. Prefers to locate in California. Registered in Idaho, Utah, Washington, Oregon and California. PW-296

STAFF PHARMACIST—Female, single. B. S. obtained in 1956 at Philadelphia College of Pharmacy and Science. Hospital pharmacy experience. Prefers to locate in the Los Angeles, California area. Registered in Pennsylvania and eligible for registration in California. PW-295

CHIEF PHARMACIST—Male, married. B. S. obtained at the Philadelphia College of Pharmacy and Science in 1951. Nine years'

hospital pharmacy experience. Prefers to locate in the North, Midwest or in the West. Registered in Pennsylvania and Delaware. PW-294

CHIEF PHARMACIST—Male, married. B. S. obtained at the University of Illinois. Extensive hospital pharmacy experience. Presently completing a four-year curriculum in Business Administration at Northwestern University. Prefers to locate in the Chicago, Illinois area. Registered in Illinois, Arizona and California. PW-291

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. Obtained M. S. at Philadelphia College of Pharmacy. Served hospital pharmacy internship. Three years' hospital pharmacy experience. Prefers to locate in Connecticut. Registered in Connecticut and Pennsylvania. PW-290

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. Obtained M. S. at the University of Iowa in 1958. Served hospital pharmacy internship. Military obligations completed. Hospital pharmacy experience. Prefers to locate in the West. Registered in Colorado and Iowa. PW-289

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. B. S. obtained at University of Illinois. Extensive hospital pharmacy experience. Prefers to locate in the East or Midwest. Registered in Illinois. PW-287

STAFF OR ASST. CHIEF PHARMACIST—Male, married. Obtained B. S. in 1954 at Rutgers College of Pharmacy. Hospital pharmacy experience. Prefers to locate in Florida. Registered in Florida, New Jersey and New York. PW-286

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. B. S. received at Purdue University in 1944. Served hospital pharmacy internship. Extensive hospital pharmacy experience. Will locate anywhere. Registered in Indiana, Michigan and Wisconsin. PW-285

STAFF OR ASST. CHIEF PHARMACIST—Male, single. Obtained B. S. in 1959 at the University of Colorado. Completed hospital pharmacy internship at Denver General Hospital in June 1960. Prefers to locate in the West or Midwest. Registered in Colorado. PW-284

ASST. CHIEF OR CHIEF PHARMACIST—Female. Obtained B. S. in 1955 at Xavier University. Five years' hospital pharmacy experience. Prefers to locate in the Los Angeles, California area. Registered in Louisiana and Texas. PW-283

ASST. CHIEF OR CHIEF PHARMACIST—Female, married. B.S. obtained in 1954. Six years' hospital pharmacy experience. Prefers to locate in New York, New Mexico, Texas and Louisiana. PW-282

CHIEF PHARMACIST—Male, married. Obtained B. S. in 1953 at St. John's College of Pharmacy. Seven years' hospital pharmacy experience. Prefers to locate in the Northeast. Registered in New York and New Jersey. PW-279

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. Received at Ohio State University B. S. Degree in Biology in 1952 and B. S. Degree in Pharmacy in 1955. Five years' hospital pharmacy experience. Willing to locate in the Eastern, Northern or Western part of the country. Registered in Ohio. PW-277

ASST. CHIEF OR CHIEF PHARMACIST—Female, single. B. S. obtained in 1956 at the University of Wyoming. Working towards M. S. Degree at the University of Maryland. Served hospital pharmacy internship. Hospital pharmacy experience. Prefers to locate in the West. Registered in Wyoming. PW-276

STAFF OR ASST. CHIEF PHARMACIST—Female, married. B. S. obtained in 1954 at St. Louis College of Pharmacy. Six years' hospital pharmacy experience. Prefers the Northwestern part of the country, but willing to locate anywhere. Registered in Missouri. PW-275

CHIEF PHARMACIST—Male, married. Obtained M. S. in hospital Pharmacy in 1954 at the University of Southern California. Served hospital pharmacy internship. Eight years' hospital pharmacy experience. Prefers to locate in the Northeastern part of the country. Registered in New York, New Jersey and California. PW-274

ASST. CHIEF OR CHIEF PHARMACIST—Male, single. M. S. obtained in 1958 at the University of Texas. Served hospital pharmacy internship. Hospital pharmacy experience. Prefers to locate in the Southwest. Registered in Kansas and Texas. PW-270

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. B. S. obtained in 1955 at the University of Nebraska. Five years' hospital pharmacy experience. Prefers to locate in California. Registered in Nebraska and California. PW-269

ASST. CHIEF OR CHIEF PHARMACIST—Female, single. B. S. Degree. Fifteen years' administrative and practical experience in hospital pharmacy. Prefers Midwest, particularly Illinois or Wisconsin. Registered in Virginia, Illinois, Wisconsin and Michigan. PW-268

CHIEF PHARMACIST—Male, single. Obtained M. S. in 1954 at the University of Tennessee. Served hospital pharmacy internship. Six years' hospital pharmacy experience. Prefers to locate in the Southwest or in Florida. Registered in Connecticut and New York. PW-266

CHIEF PHARMACIST—Male, married. M. S. obtained in 1957 at the Nebraska University College of Pharmacy. Served hospital pharmacy internship. Six years' hospital pharmacy experience. Prefers to locate in the West or Midwest. Registered in Colorado, Missouri and Nebraska. PW-265

CHIEF PHARMACIST—Male married. Obtained M. S. in hospital pharmacy at the State University of Iowa in June 1959. Served hospital pharmacy internship. Three years' hospital pharmacy experience. Will locate anywhere. Registered in Illinois. PW-264

CHIEF PHARMACIST—Male, married. B. S. Served hospital pharmacy internship. Extensive hospital pharmacy experience. Prefers to locate in the Midwest. Registered in Ohio. PW-263

CHIEF PHARMACIST—Male, married. B. S. Fourteen years' hospital pharmacy experience. Prefers to locate in the East or Midwest. Registered in Pennsylvania and West Virginia. PW-260

ASST. CHIEF PHARMACIST—Male, single. Obtained B. S. in 1956 at Purdue University. Hospital pharmacy experience. Prefers position with some administrative and/or teaching duties. Would like to locate in Northeast or Southwest section of country. Registered in Texas. PW-256

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. Obtained B. S. in 1954 at South Dakota State College. Two years' hospital pharmacy experience. Will locate anywhere. Registered in South Dakota. PW-247

STAFF PHARMACIST—Male, married. Received B. S. in June 1960 at Philadelphia College of Pharmacy and Science. One year's hospital pharmacy experience. Prefers to locate in Philadelphia. PW-246

DIRECTOR OF PHARMACY SERVICES—Male, single. Received B. S. in 1956 at the University of California. Served hospital pharmacy internship. Four years' hospital pharmacy experience. Registered in California. Prefers to locate in California. PW-237

PHARMACIST—Female, single. M. S. received at the University of Maryland in 1951. Served hospital pharmacy internship. Five years' hospital pharmacy experience. Prefers to locate in New Jersey. Registered in Pennsylvania and Missouri. PW-225

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. B. S. received at Detroit Institute of Technology in 1950. Four years' hospital pharmacy experience. Prefers to locate in Michigan. Registered in Michigan. PW-224

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. Received B. S. at Medical College of South Carolina in 1950. Four years' hospital pharmacy experience. Prefers Southeast section of country. Registered in North Carolina and South Carolina. PW-221

STAFF OR CHIEF PHARMACIST—Male, single. B. S. received in 1952 at St. Louis College of Pharmacy. Two years' hospital pharmacy experience. Registered in Missouri. Prefers to locate on the West Coast, particularly Calif. PW-217

STAFF PHARMACIST—Female, single. B.S. Seven years' hospital pharmacy experience. Southwest section of country preferred. Registered in Alabama and Georgia. PW-199

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. M. S. obtained in 1956 at Columbia University College of Pharmacy. Hospital experience. Prefers to locate in California. Registered in New York, Michigan, New Jersey and Florida. PW-184

ASST. CHIEF OR CHIEF PHARMACIST—Male. B. S. received in 1954. Desires to locate in Michigan, Ohio or Illinois. Registered in Michigan. PW-177

CHIEF PHARMACIST—Male, married. B. S. Ten years' hospital pharmacy experience. Registered in Mass., Ill., Mo., Ky., Tenn., and Va. PW-150

ASST. CHIEF OR CHIEF PHARMACIST—Male, single. Registered in D. C., Ill., Md., and Penna. Graduate University of Pittsburgh in 1953. Experience in research. Prefers North and East PW-148

CHIEF PHARMACIST—Male, married. Graduate of St. Johns University College of Pharmacy. Extensive experience as chief pharmacist and purchasing agent. Prefers to locate in New York or New Jersey. Registered in New York and New Jersey. PW-144

ASST. DIRECTOR OR DIRECTOR OF PHARMACY SERVICES—Male, single. B. S. Retail and five years' hospital experience. Registered in Illinois. PW-119

CHIEF PHARMACIST—Female, single. Registered in Pennsylvania and Ohio. Twelve years' hospital pharmacy experience as a chief pharmacist. Desires to locate in Pennsylvania or Ohio. PW-111

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